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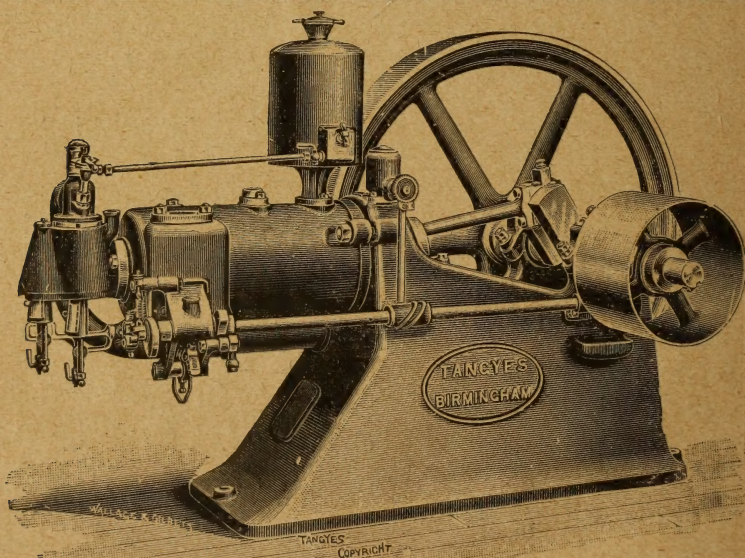
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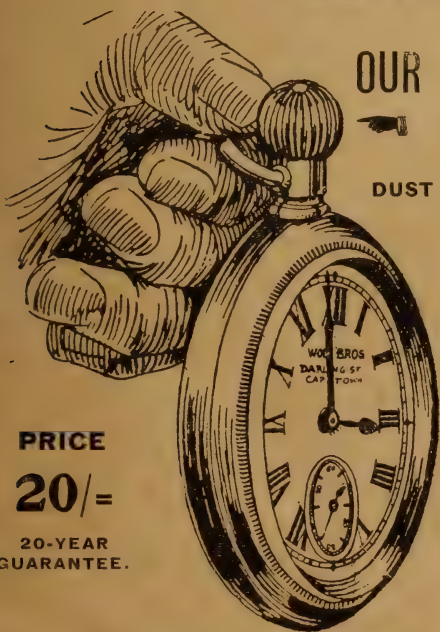
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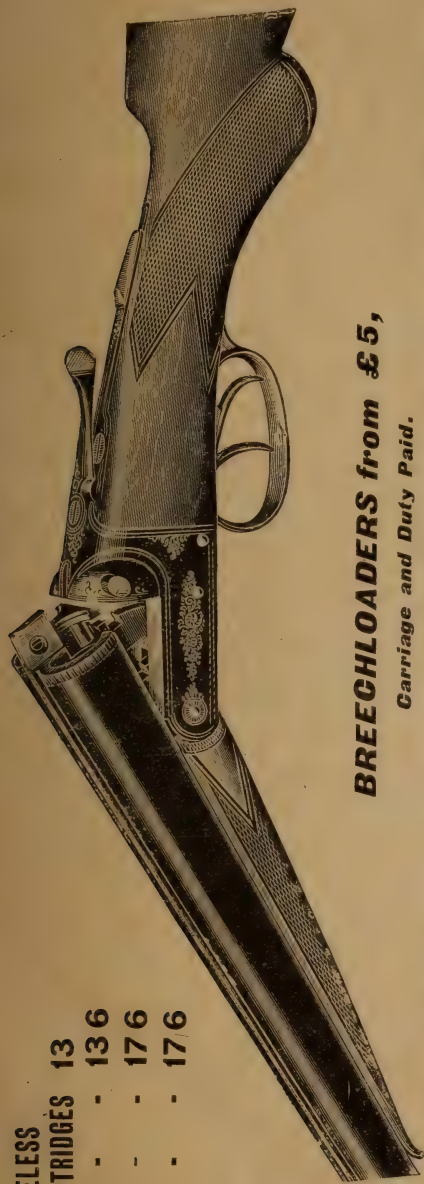
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# THE RHODESIAN AGRICULTURAL JOURNAL

Issued by the Agricultural Department.

EDITED BY L. A. KING-CHURCH.

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VOL. IV.—No. 2.]      DECEMBER, 1906.      [5s. per annum.

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## Editorial.

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In the last issue of this Journal Mr. Sawyer refers to the severing, for a period, of his immediate connection with Rhodesian agriculture. It is to be hoped that his absence may be brief, that the fascination of this new and fast developing country may soon induce him to return again to carry on the work which he has up till now so ably organised and administered.

Rhodesia's loss is Natal's gain, but Rhodesia may be the greater gainer in the long run, if only Mr. Sawyer should be induced to return, after reaping in fields and pastures new, fresh stores of experience, which a man of his undoubted ability cannot fail to acquire, and use to the very best advantage. The general regret expressed at his departure must be most gratifying to Mr. Sawyer as an appreciation of his successful work among us.

His successor, who, in taking up the work where Mr. Sawyer laid it down, has entered upon no light task, though new to Rhodesia, and its peculiar demands, is not without South African experience. A sound elementary training in an agricultural college at home, followed by some years of practical farming in Natal, should go towards equipping a man for such a post as this. And

when that man is keen and ready to learn, and put to the best advantage all that a sympathetic farming community can so readily supply, he should not fail of some measure of success.

Already in his short stay here he has had proof of the good-will of the farmers towards the occupant of his post, disappointed though they may be at the departure of a man in whom they had confidence; and this display of good-will prompts him to appeal to all in the agricultural world to afford him their support, such as they so ungrudgingly gave to his predecessor. He assures them of his heartiest endeavours to adapt himself to his many-sided work, and to keep the interest of the farmers ever before him. At the same time, conscious as he is of his many faults, he invites their criticism, and will welcome all suggestions.

The production of his first journal is of necessity an anxious undertaking, but he hopes to maintain and perpetuate that high standard that has already been achieved.

By the time this Journal is issued, the period for selecting and forwarding to the Agricultural Department all produce and material for exhibition at the United South African Exhibition, to be held in London, from February 13th to March 18th, 1907, will be drawing to a close. The latest date for despatch from Salisbury is January 8th, and from Bulawayo January 9th, except in the case of fresh fruit and produce, which can be consigned weekly.

It will be a great opportunity missed, if every advantage is not taken of this Exhibition, to advertise, as fully and as attractively as possible, all likely products of this country; and not only those known commercial products, but others too, such as the many bushes, roots, and other plants growing in profusion all over the country, which may be found to possess a high commercial value of which we are at present entirely ignorant. Two instances of this may be quoted in illustration.

Some years ago Natal sent to England for exhibition a specimen of wattle bark, not knowing that it possessed any commercial value. At the present time the annual export from Natal in wattle bark alone amounts to £100,000. Again, there was sent to the Exhibition of Colonial Products, held in London last year at the Horticultural Society's Hall, from Cape Town, a sample of berry wax, which no one up to that time had considered

worth collecting. On being analysed by the Director of the Imperial Institute, it was found to be an excellent article for the manufacture of soap, etc., and an offer of £29 per ton was made for it, while subsequently on its being placed on the open Market, as much as £50 per ton was quoted, provided that constant supplies could be guaranteed. Full particulars with regard to quantity procurable, and all possible information, should be sent with all exhibits, as merchants cannot be persuaded to buy unless they are assured that further supplies are forthcoming in sufficient quantities to enable them to meet their requirements.

Many farmers may say that the time has not come when we should advertise our products, as the supply does not yet satisfy the demand. For some few years this may be true, but it is a universally acknowledged maxim that advertising pays, and if the present rate of progress is to be continued in this country, it is by no means too soon to look well ahead and build up a future market for our increasing output. Another reason for making every effort to provide a good and attractive show at the Exhibition is the certainty of attracting fresh settlers to the country. Since Mr. Wise's report attention has been drawn to Rhodesia as a farming country; a good exhibit should act as a corollary to Mr. Wise's proposition.

If a man realises that these things which he sees exhibited can be, and are produced in this country, and also that there is always a good market for whatever he produces, surely this, more than anything else, will make him consider what a most desirable country Rhodesia is to live in, and will induce him to bring himself and his "incumbrances" to swell our population and increase our wealth.

Every man has something of which he is particularly proud. It may be some of his stock, or some farming implement that he has bought or invented that comes up to, or exceeds his expectations; these, of course, he cannot exhibit; but probably there is something that he takes everybody who visits his farm to see, something that is the produce of his labour and his soil. That is the thing to send to London, to let everybody see, to show the man who is wavering between Rhodesia, and say Canada, and throw in the weight on our side of the scale. There will be somebody there to tell him all about the climate, the



advantages, the beauties, and the attractions of this our country, but let him but feel, smell, and see some of our best productions, and he will be more deeply touched, more strongly moved, than in a hundred eloquent lectures, and each individual exhibitor will be able to congratulate himself that he has had his own personal share in introducing this great and promising country to yet one more Colonist.

In another part of the Journal is published Mr. C. D. Wise's Land Settlement Report. This will prove interesting reading to farmers as an unbiassed account of the first impressions of an experienced farmer. Mr. Wise is undoubtedly struck by the up-to-date methods employed by farmers, and has formed a high opinion of the present state and future prospects of agriculture. At the end of the report will be found a list of the imports into Rhodesia, which will give a very good idea of the markets available for local supplies. Each new settler, although he will in time become a producer, is also a consumer, and increases the demand for those things which he cannot himself supply. More population, closer settlement, and greater competition, are each much needed in this country.

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## **Report on Land Settlement in Southern Rhodesia.**

---

By C. D. WISE.

Extracts from letter from Mr. C. D. Wise to the British South Africa Company.

Overbury,  
Tewkesbury,  
May 27th, 1906.

SIR,—

In accordance with instructions received from the British South Africa Company, I left Southampton on October 21st, 1905, and proceeded to South Africa, the objective of my tour being Rhodesia, and, after careful inspection of certain defined areas in that country, to report on the land, the farming of to-day and the possibilities of land settlement. It was, however, thought

desirable that I should spend some time in the South, so as to appreciate the broad conditions of South African Agriculture, and I therefore visited certain districts in the Cape Colony, and wide areas in the Orange River Colony and the Transvaal, paying especial attention to Land Settlement Schemes, particularly in the two last-named Colonies.

\* \* \* \* \*

On arrival at Bloemfontein I called upon Sir Hamilton Goold-Adams, who was kind enough to place transport at my disposal, and both His Excellency and Major Apthorpe, Director of Land Settlement, gave me the fullest possible information.

In the Transvaal Lord Selborne gave me the honour of an interview; Mr. A. Jameson, Commissioner of Lands, and Mr. MacDonald, Acting Director of Agriculture, rendered me great assistance; transport was provided.

I beg to submit my report herewith.

\* \* \* \* \*

I have the honour to be,

Sir,

Your obedient Servant,

CHARLES D. WISE.

To the Secretary,

British South Africa Company,

2, London Wall Buildings,

London, E.C.

## REPORT ON LAND SETTLEMENT.

In considering my remarks on the farming of to-day, as I saw it in Rhodesia, it must be remembered that I was in the country from the end of December to the middle of March, and therefore saw it at its best, and my notes are simply given as impressions. To form any really sound opinion on the farming possibilities of the country, a man, no matter what knowledge he may have of farming in this country, if he has not had Colonial experience, would at the least require to study the question for a year, seeing the country in the dry as well as in the wet season. Any conclusions I may have arrived at, and any suggestions



I may venture to make, are therefore largely based on information given me by men who have made farming their business in Rhodesia, and I must say I have never met a more courteous lot of men; one and all gave me every possible assistance, not only by entertainment for man and beast, but also by answering the thousand and one questions which I asked them. What particularly struck me was the plucky way in which these men, whom I may call the "pioneer farmers" of Rhodesia, have stuck to their business in spite of native rebellion and war, rinderpest and coast fever, which swept the cattle from the country, and from which it is only now beginning to recover. What is the result? The majority, *i.e.*, the workers and the men who have put their backs into it, in spite of all drawbacks which they have had to face, and which we who come after may reasonably hope to look upon as past, now have comfortable homes on good farms, are prosperous and making a bit more than a good living, the result of their own energy and ability, assisted by a fine climate, with an average rainfall in Mashonaland of 32 ins., and in Matabeleland of 22 ins., and last, but not least, by some good land.

The census, taken in April, 1904, returns 984 holdings, of which 32,000 acres were under cultivation; since that date the Secretary for Agriculture states that 25 per cent. more land has been taken up. I was also informed by the Lands Department that they have had more enquiries for farms during the past year than they have ever had before.

At present the farmer has to rely on native labour; the price paid varies from about 7s. to 15s. per month, food (about 2 lbs. of meal per day) extra. In the mining districts labour is dearer; the farmer, however, is recompensed here by a market at his door for some portion of his produce. As a rule (there were exceptions), I found farmers fairly well off for labour. As far as possible, however, labour-saving machinery is used.

One white man is sometimes engaged as overseer and general assistant, but the rate of wages for white men prohibits their more general employment. Later on, when there are more sheep and stock generally in the country, and agriculture begins to go ahead, no doubt there will be more white men employed, and men who come out to take farms will be able to get work, not only before they take

up land, but after they have made a start on their own account, and thus augment their incomes by extra work at harvest time, sheep shearing, etc.

I was surprised to find so much up-to-date machinery in the country—ploughs of all makes (the difficulty was to makè up one's mind as to which did the best work), mealie-planters, mowing-machines, horse-rakes, separators in the dairy, and, in fact, a good general selection of farm implements. It is interesting to note that farm implements during the past two years have been imported to the value of £18,952. This speaks for itself, and shows that the farmers in the country are not sitting still, and that they fully realise the advantages of labour-saving machinery.

The soil in the valleys is, as a rule, rich deep black soil, and is well suited to agriculture. The higher land, which is in most places sandy where there is granite formation, will carry a fair head of horned stock and, in parts of the country, sheep. At present, with no winter feeding, farmers calculate the land will carry one beast to 10 acres. There are two classes of veldt—"sour veldt" and "sweet veldt." When the heavier class of land has been broken up and has got mellow (as was brought to my notice on one large farm I visited), it will carry some grand crops. The chocolate-coloured and red soil is excellent; this is found where there is ironstone; there are large tracts of this red soil round Salisbury, and, in fact, all over the country. It is easily worked, and will grow practically anything. The natural lie of the country lends itself to division for farms—in parts, undulating with well-watered valleys (especially in Mashonaland), fairly clear of bush, the bush, as a rule, being on the higher ground; in other parts, more mountainous—ranges of hills with rich valleys between.

The lighter class of land, particularly the sandy soil, is deficient in lime. The red soil contains more. Analysis of twelve samples taken from different centres in Mashonaland and Matabeleland shows, in the former, 0.52 lime, and in the latter 2.12 (*Rhodesian Agricultural Journal*).

There is every reason to hope that the "African coast fever," which has ravaged the country during the past five years, has been practically stamped out; restrictions as to the movement of cattle were relaxed in April, and

should this not result in fresh outbreaks, the movement of cattle will shortly be allowed in the country under regulation, exceptions only being made in those districts which cannot be declared free. This will give an enormous impetus to stock breeding for which the country is so admirably adapted.

"Redwater" has to be reckoned with as a disease to which stock are liable. The disease is not contagious, but is conveyed from infected animals by ticks. Imported cattle should, I understand, be dipped to keep them free of ticks, but young stock should be exposed so that they get naturally immune. Cattle which are bred in "redwater" districts are more or less immune, but if they are removed for a time and then brought back, they may contract the disease. By dipping and spraying and destroying the ticks to get rid of coast fever we are, I was told, possibly losing the natural means of immunization of cattle. If, however, all ticks can be destroyed within fenced areas, it would appear that those areas would be entirely free from "redwater."

In spite of the ravages of coast fever, I found a good head of cattle on some of the farms visited. These, as a rule, consisted of crossbreds—farmers have been only too glad to breed any class of cattle they could. I found in some instances descendants from the bulls imported by Mr. Rhodes, and wherever this was the case an improvement in the class of beast was observable; the best bull I saw was a deep rich red shorthorn bull by one of the imported bulls referred to, out of a good class of cow, which must also have been a shorthorn—if not quite pure, very nearly so. Crossbred bulls are mostly used, for farmers have been unable to get bulls of any special breed into the country. Now that the coast fever has been got over, and restrictions as to movement of cattle are to be relaxed, these difficulties can be overcome, and, in one or two instances, farmers are making arrangements to import bulls. The Ayrshire for milk, the Devon and Shorthorn for beef, seem to be the breeds from which it is thought bulls should be imported. The native cattle are the Angoni and the Mashona, both nice quality, but small; the former would weigh, I should say, 300 to 400 lbs., and the latter 500 to 600 lbs.; they are not good milkers. For transport and farmwork generally the "Afrikander" cannot be beaten, but for beef these cattle



are too slow in reaching maturity. The Friesland is a good milker, though I understand the milk is deficient in butter-fat; the steers make good transport cattle. If the Company establish a good breed of cattle—a milking strain and a beef strain—on their central farms, it will be a benefit to the farmers outside the settlements if arrangements can be made for them to have the use of stud animals, where distance permits, and also if they can purchase a good class of bull from the farm.

Rhodesia being undoubtedly a stock country, the improvement of the existing class of cattle is of the very greatest importance. In old days, I am told, “the country was black with cattle;” what they lived on in the dry season puzzles one, but I was also told that the native cattle keep their condition in the dry season in a marvellous way. Here, then, is a good foundation, and I recommend settlers to start with the cattle of the country and improve on them later if they can. With winter feeding, the production of beef and dairying (one or the other according to the class of farm) should prove remunerative. At the present time one beast to ten acres is what a farm is expected to carry; if I make no mistake, we shall see the time when the land will carry considerably more. Here again I can only surmise, having had no experience of the country in the dry season.

I was told by one of the biggest cattle-owners in the country that 100 cows will breed 80 to 90 calves a year.

A few cases of cattle being poisoned by eating poisonous plants were reported to me and were under investigation. I believe (as in the other South African Colonies) the “tulp” is to be found, particularly on low ground; this is a virulent poison. The natives prefer keeping their cattle on the high ground, and, probably, that may be the reason.

At the present time it is exceptional to find any sheds and yards for cattle; kraals, which are simply walled-in or fenced-in enclosures, are used; cows are driven into these for milking, and their legs tied during the operation. If winter feeding is carried on, it may be found better to fodder the cattle in yards (or kraals) with some rough sheds for shelter. In the same way the cows would surely do better if, instead of lying in a kraal all night with no shelter, they had sheds to shelter them in bad weather. I saw native cows driven into kraals in which they were

literally up to their bellies in sludge, and in this they remained all night. Can this be right? They say the mud keeps off the ticks. The cattle were, as a rule, in first-class condition.

The question of how best to improve existing methods can only, after all, be answered by practical demonstration, and it is impossible to lay down the law on this, or any other such matter, until one has worked a farm for two or three years. As one of the farmers remarked, "We are all learning."

Beef was 9d. per lb. retail, while I was at Salisbury, and at Umtali a large farmer told me he made 5½d. per lb. delivered wholesale to butcher, dead weight.

The 1904 census gives the number of cattle in the country as 30,369 held by Europeans and 94,544 held by natives.

Unfortunately I was unable, through want of time, to visit the best sheep district in the country, which extends from Melssetter to Inyanga. I saw very few sheep; those I did see were mostly native. The Persian will do well, either pure or crossed on the native sheep, or on the Cape fat-tailed sheep, and I am told that a good breed is to be found in Bechuanaland, in Khama's Country. In the Melssetter and Inyanga districts Merinos do well, and I see no reason why, if they are kept out of the low ground in the wet season, they should not do in other parts of the country after the veldt has been grazed down with cattle and kept down for a year or two. A Bradford wool merchant, who has lately been in South Africa, speaks well of the Shropshire crossed on the Merino. Persians are, no doubt, best where there is much bush, as wool sheep get torn, but the wool sheep is the one that will probably pay best in the long run.

Mutton was 1s. to 1s. 3d. per lb. retail, while I was in the country.

The number of woolled sheep in the country in April, 1904, was 2,629; and of other sheep 13,421 held by Europeans and 99,912 held by natives.

One cannot imagine a finer country for horse breeding. Let us hope that Dr. Theiler's serum, which I believe he hopes to issue before next year, will be effective, and that the country may eventually be as free from horse-sickness as the Orange River Colony, where I saw a good class of horse.



The ration for the Government horses is 6 lbs. mealies and 8 lbs. forage per day.

The number of horses in the country in April, 1904, was 1,783, held by Europeans only.

Not many mules are bred. In April, 1904, there were 2,540, the property of Europeans, in the country. They suffer from horse-sickness, but a slightly larger proportion than horses recover, and, thanks to the wonderful discovery by Dr. Theiler, they can now be successfully inoculated. The majority are Colonial bred, but there are a good many Argentine, which were imported during the war.

Donkeys have been, one may almost say, the salvation of the country. They do not suffer from horse-sickness, and have done the bulk of the transport work and cultivation on the farms since the outbreak of coast fever amongst cattle. In April, 1904, there were 8,302 donkeys in the country, Colonial and German East African, all the property of Europeans. They are of average size, but the former require feeding in the dry season; the latter keep their condition better and do not require feeding. As far as I could ascertain, the only two stud donkeys in the country are the two Zanzibar "jacks," which stand at the Transport Department, Salisbury, for the use of farmers; the fee is 10s. per mare. Not many mares had been sent up to March last. Donkeys suffer from biliary fever, but this is not serious, and there are not many deaths. As far as I could discover, there are no stud donkeys of any special breed in Matabeleland. Of course, all farmers breed donkeys, but use only their own "jacks," and they do not keep stud animals for hire.

I understand that the Secretary for Agriculture is negotiating with a view to obtaining some more stud animals. It would certainly be a great advantage to farmers and transport riders if the breed of donkeys in the country could be improved. The difficulty is in locating stud animals in suitable centres to which mares would be sent.

The black pig is preferred by many farmers to the white. I saw good lots of both black and white. The native pig is, as a rule, a miserable brute. The staple crop of the country is maize—an excellent food to finish pigs that are fattening. The imports of bacon and hams are sufficient evidence to show the room there is for pig-breeding and feeding. A movement

and special facilities will, I understand, be granted by the railway companies for the carriage of live pigs from all parts of the country to the factory. The establishment of such a factory is a move in the right direction and worthy of support. In 1904 there were 7,635 pigs in the country, the property of Europeans. Mr. Sanders Spencer, one of the largest pig-breeders in England, remarks, in an article in the *Rhodesian Agricultural Journal*: "You appear to have at your very doors one of the best extant markets, where prices can be realised which are unobtainable in any other country in the world; you have climate, which is, at least, as suitable as that of many countries to which I have exported pigs; and, further, the food for the pigs can be produced to almost any extent in the Colony, and the use of ice renders the bacon-curer quite independent of the warm climate. . ."

The price realised for pigs in Umtali was 4½d. per lb. live weight delivered, and at Salisbury 10d. per lb. dead weight delivered.

The native goat does well. At many of the kraals I visited the goats had "scab"; dipping will eventually have to be made compulsory. The Angora, I was told, also does well, but I saw very few; they require special management and sheds for protection. In 1904 there were 2,968 Angora and 14,582 other goats in the country, the property of Europeans, and 315,927 held by natives.

At all the farms I found poultry; 65,000 was the return for poultry in the country in 1904. They suffer from various diseases and want attention. I saw a very nice stock at several farms, including turkeys.

There are very few domesticated ostriches in the country. The only farm on which I saw any was Mr. Hull's in the Matapos. I saw wild ostriches in the Headlands and Rusapi districts. I see no reason why, in parts of the country, ostrich farming should not succeed.

Mealies have been, and are still, the main crop. An average crop for a series of years, I was told, could not be taken as more than four sacks per acre, though I should say the best men average nearer eight sacks, and that this average will be increased by improved cultivation and selection of seed.

Wheat suffers from rust, and is at present only grown successfully under irrigation in winter; it is planted in May and June and harvested in September and October.

I saw a fine sample of wheat at two farms at Headlands, grown from Egyptian seed under irrigation. What is wanted is good rust-resisting wheat; it is to be hoped that this will be found, so that farmers can go ahead and produce more; £30,000 worth of wheat-flour was last year imported into Rhodesia alone. Experiments in wheat-growing should be carried out systematically with seed from different countries, and also to ascertain the best time for planting.

Oats are also grown under irrigation, "Boer" and "Algeria" being the principal seed used. Practically no oats are harvested and threshed; the crop is cut just before it is ripe and used for fodder as "oat-hay." This, of course, strikes one as wasteful, but no doubt there are many considerations which it is necessary to weigh up before condemning what is the general custom of the country; one naturally thinks it would pay better to harvest and thresh the oats, using the straw for fodder for cattle, and replace oat hay by meadow hay for horses, and sell the oats.

I saw good samples of barley, but at present very little is grown, and what is grown is used generally for fodder.

The French bean and the haricot bean grow well, but only on one farm did I see any quantity being grown.

Milletts of several varieties are grown principally by the natives.

It is exceptional to find a hay-rick on a farm. Farmers rely on the wide area over which their cattle can roam to provide "feed" through the dry season. I feel sure that winter feeding will become more general and a necessity, especially when the breed of stock is improved.

What can be cheaper or answer the purpose better than hay, either for cattle which are being fed for the butcher or for dairy stock? The cost of making hay near Salisbury was given me as £1 5s. per ton.

Not much ensilage is made in the country, and the example of the other Colonies in this respect might well be followed. Mealies, planted late, any quantity of grass, etc., could all be made into ensilage, which would come in as useful feed in the winter season.

These are largely grown on the Jesuit Mission Farm at Chishawasha, near Salisbury, where they have a machine for extracting the oil (there is 50 per cent of oil in these nuts), and they are also cultivated by Rhodesia Consoli-



dated, Limited, at Gravesend Farm, their market being Kimberley. This is a crop to which more attention might be given, and if grown extensively in a district it should pay to put down a plant for extracting the oil.

I did not see much land under lucerne. I should certainly advocate a good acreage of this crop, if possible, under irrigation on every farm. It has been the making of farms in Cape Colony. It can be cut for hay several times in the season, as well as grazed.

Manna grows well and makes excellent fodder.

Orchards have been established in various farms and estates, and the rapid growth of the trees is extraordinary. Citrus fruit especially is grown successfully. Japanese plums bear well, and, as I believe they ripen a few weeks earlier than the Cape fruit, should be a paying crop. All the following varieties of fruit grow and do well in the country, and most of these I saw: Loquat, quince, lemon, lime, paw-paw, persimmon, grenadilla, mangoe, pomegranate, banana, guava, peach, apricot, grape, mulberry and apple. Pears do not seem to do well—why, I do not understand.

Small fruit, such as strawberries, is not grown largely. There is no jam factory in the country, and no facilities for marketing "soft" fruits. I saw splendid grapes growing at Salisbury, and the Italians who are farming on the Borrowdale Estate think well of the prospects of vine culture.

There should be an orchard on every holding or farm, and I hope on the Company's Settlements that, by co-operation of the growers in packing and marketing—thereby getting special rates from the railway companies—a remunerative trade will be established. This is referred to later on under the Land Settlement section of this report.

I had not time to visit the fruit farm at Inyanga, but I saw their exhibits at the Salisbury Horticultural Show, and the quality was excellent.

The local markets seem to be supplied principally by small holders round the towns, and during the time I was in Salisbury vegetables were cheap, except cabbages and onions. Potatoes were scarce and making 2d. per lb.

The Company have lately received a special report on tobacco from a tobacco expert. I need only say that there seems to be a fine opening for the growth of tobacco, for

which the country is, no doubt, admirably adapted. Several farmers are going in for tobacco growing, and the establishment by the Company of a central warehouse for sorting and grading, and for generally getting the leaf into condition for manufacturers under the supervision of an expert, who has been engaged for this work, should be a great assistance to the growers, while the substantial prizes which are being offered by the Company for the next three years for different grades will give growers further encouragement. The Agricultural Department also assists growers by the distribution of seed.

The dam in the Matopos which serves one of the estates of the Rhodes' Trustees is the largest scheme in Rhodesia. Having in view the dry seasons experienced during the last few years, the necessity for irrigation becomes more apparent. I should not recommend expensive schemes to start with; make a slow and sure beginning. Where there are perennial streams irrigation can be carried out at a moderate cost, and winter, as well as summer, crops may be grown, in fact, a regular rotation of crops would be established, and the wonderful fertility of the soil fully developed. It is not necessary for me to dilate here on what has been done in India, Egypt, Italy, America and other countries by irrigation of land; I would only point out that, in my opinion, the permanent development of agriculture in Rhodesia will be enormously assisted by, and dependent to a great extent upon, irrigation. I venture to suggest that it would be a wise policy on the part of the Company to obtain a report on the possibilities of irrigation from an expert; it would pay to do so. In Mashonaland particularly it should not be difficult to devise schemes whereby large areas could be put under irrigation at moderate cost, and in taking up an area for settlement it is of vast importance to make the best use of the available water, and to have the best possible advice before spending money.

I would suggest that the central farms which I advocate for each area taken up for land settlement (*see* Land Settlement Report), should receive a special grant from the Administration to assist in carrying out experimental works, such as trials and selection of seeds, trials of insecticides, the Agricultural Department assisting and reporting on trials in the *Rhodesian Agricultural Journal*, and inviting inspection by farmers and others of the trial

grounds at all times. A great advantage in carrying out such trials on the central farm at each settlement is that these farms will be in different parts of the country, and experiments will therefore be more valuable, being carried out under the local conditions of that particular district, than they would be if carried out at one centre. These farms could also be utilised by the Administration as centres for stud animals for the use of farmers at a moderate fee.

An agricultural chemist would also be of great assistance. Experiments carried out on practical lines will be of great benefit to the country, and if the land settlement central farms are utilised as suggested, the Administration should be getting maximum results at a minimum cost.

As far as I am aware, there is no co-operation for purchase or sale in the country at the present time. It is difficult, where distances from farm to farm are so great, to organise it, but yet it is not impossible, and if a start is made on sound lines it will not only be of great assistance to men who are now farming, but will tend to bring others into the district. I refer further to this under "Land Settlement."

I recommend a wire fence with iron standards 25 to 30 yards apart, with either wood, iron or laced wire droppers—the two top wires barbed, and the remainder solid wires. The fence put up by the Company on the Fingo location, near Bulawayo, is as follows:—T iron posts 24 yards apart; 4 standards of 4-point barbed wire; 4 wire droppers laced in, 4 ft. high. If sheep are to be fenced they would have to add two more plain wires. Timber posts soon perish; the best native timber for fencing is wild fig, mtsamvi, mtiti, msusu, mtoa, majange. For live fences the Mauritius thorn and kei apple is recommended. Fencing is undoubtedly the means by which cattle diseases will be kept within bounds. Farmers should be encouraged to fence their boundaries, or at all events to fence out the main roads.

As the country is taken up and becomes more thickly populated, there will be more traffic, and roads will have to be improved. Districts which are out of reach of the railway will have to be opened up by making roads to them. Motor traction in the wet season is almost impossible on the roads in their present condition, and, if any regular service were established to any special district



bridges would have to be built and the road properly formed and maintained. How to provide funds, first, for the capital outlay, and, secondly, for maintenance, is a problem which must be overcome. If the country is to be developed, means of transport will certainly have to be improved; at present vast areas are not yet tapped by the railways, and it is a matter for serious consideration whether motor traction will not be the transport for the future, and a feeder to the railways.

The Melsetter, Victoria, and Enkeldoorn districts may be taken, I think, as examples where better communication is needed to enable them to go ahead.

### LAND SETTLEMENT.

My instructions were to report especially with reference to land settlement in Rhodesia.

Let me say at once that, provided a workable scheme can be initiated, a scheme under which the settlers will eventually acquire the freehold of the land they take up, and the Company will earn a fair rate of interest on its advances, I can see no reason why land settlement should not be successful. It must be borne in mind, however, that, if the land is burdened with a costly scheme, land settlement will be a failure.

I would suggest that blocks of the Company's land be reserved for settlements, such land to be subject to the usual quit rent of 1s. per 25 morgen per annum, which would become payable only from the date of occupation by settlers in respect of their individual holdings.

The Company should, in my view, dispose of their land to the first settlers at a low but fair rate, according to the market value of land in the country to-day, reserving, however, alternate blocks: they should assist these men as far as possible in reason, without spoon-feeding, and make them successful; their success will mean the success of land settlement and the development of the country.

The selection of the first settlers is of the greatest importance; if they fail, the scheme will fail; therefore, we must be more than careful. We must get the right class of men—men who have been born on the land, and who understand their business. The man who can plough, reap, mow, milk, and do the work of the farm himself will succeed; if he is short of capital, assist him, otherwise

than by direct advances in cash, and control him until he can pay his own way. Make men successful by their own industry, and they will bring others.

I believe that Rhodesia is a country capable of enormous development from the agricultural point of view, to say nothing of the cultivation of special crops and the establishment of industries such as tobacco, fibres, oil (from the monkey-nut and castor oil bean), flax, hemp, and cotton and rubber in selected districts.

The climate is, I suppose, second to none; the rains from November to March are abundant, and in the winter, March to November, the perennial streams, more particularly in Mashonaland, will enable irrigation to be undertaken at a reasonable cost; in addition, water can be obtained practically anywhere at a reasonable depth by boring.

As regards health, this is one of the most serious considerations, especially for men to whom Colonial life is new, and it is a point on which I made careful enquiry, with the result that, except for malaria, the country appears to me to be wonderfully free from disease. As in all tropical countries malaria has, undoubtedly, to be reckoned with; but, if houses are erected on suitable sites and reasonable precautions are taken, the fear of malaria need not deter men and their families from settling in Rhodesia. In the words of Dr. Fleming, the Medical Director for Southern Rhodesia, in his paper on "Malaria in Rural Districts of Rhodesia and how to prevent it" (a paper which should be in the hands of all settlers in the country):—

"Rhodesia, with its high altitude, its low mean temperature, and ideal climate, is essentially a country where the European may settle with every prospect of future success, and where one may reasonably hope that malaria will cease to exist amongst the European population, except, perhaps, in the lower-lying districts and borderlands of civilisation."

The statements showing the imports of agricultural produce into South Africa are most interesting. These statements, which are to be found in the "Blue Books" of the various Colonies, contain some startling information and reveal the enormous amount of food-stuffs im-

ported into the country which should be produced by local farmers. Rhodesia herself has a fair margin before her own requirements are filled, and one naturally turns to the Transvaal next as being the nearest outside market where, in beef and mutton, the imports amount to £732,464, and dairy produce to £456,155.

The preceding paragraph indicates that there is a vast market in South Africa for the agricultural products of the country. To tap those markets, farmers must co-operate and market their produce in bulk. Not only must they themselves co-operate, but they must co-operate with the railway companies. The railway companies have given special rates in many cases, but there can be no doubt that as soon as the farmers can bring a regular supply to the railway, in bulk, still greater reductions will be made; trucks will be built to carry special products, and the one industry will assist the other. The organisation of markets and transport is one of the most important factors in building up the success of any community of farmers. Local markets in Rhodesia are Salisbury, Bulawayo and Umtali (where there are large railway works). With their present population the requirements of these towns would soon be filled if the number of farmers in the country was largely increased, but when that happy day comes it will be found that the presence in the country of the farming industry, and other industries in connection with it, will mean an increase in the consumption of food-stuffs. Moreover, the mining population is increasing, and, from all accounts, is likely to increase.

Exports are small at present; last year mealies were exported to Kimberley, and there is already a demand for Rhodesian tobacco in the United Kingdom. Wool and cotton have also been exported in small quantities and reported upon favourably. After feeding her own population, Rhodesia will, it is hoped, export general produce in large quantities to the other South African Colonies, and special products to Europe.

It appears to me that the first thing to do is to select an area for a central farm as near as possible to the centre of the block of land chosen for settlement; if possible this farm should control the main waters to be utilised for general irrigation. I have already said that alternate farms should be reserved, so that when the district develops, and the value of the land naturally increases, the



Chartered Company will be able to sell the reserved farms at an enhanced value. With this object in view I should make the central farm much larger, say 5,000 acres, than eventually it need be, thereby at once reserving an area which, in a few years, should be very valuable. It must also be remembered that the road from this central farm to the nearest point of railway must be made so that it is of the greatest possible advantage to the settlement as a whole. It may be thought advisable to make the central reserve even larger than 5,000 acres, as it is more than probable that a small township, with a commonage, would eventually be formed at each centre.

A resident Sub-Manager should be engaged—a thoroughly practical man, who can speak the native language, and who knows the customs of the country. He must be a man who can not only superintend the ordinary work on the central farm, including the diary, but also carry out experimental work, initiate settlers into the customs of the country, and control the management of the “general store,” to which I shall refer later. He would also be responsible for the execution of all development work which may be done on the various farms before they are taken up, and for improvement works authorised later. This Sub-Manager must, therefore, be a man of ability, and the class of man settlers would work with.

Arrangements must be made to put up accommodation for men who come for one year's training before taking up their holdings.

It may be advisable to do some fencing at once, but, as it may be necessary during the first year or two to adjust boundaries, it would be wise not to go too fast.

As soon as possible a good head of stock should be got on the central farm; the Company should not be too particular as to breed. I understand that a considerable number of cattle in the North belong to the Company, and it may be possible to transfer a portion of this herd. I should certainly start with the cattle of the country, Angoni and Mashona, and also buy Afrikaner, Friesland or any cross-bred cattle that can be picked up. If bulls are not to be got in the country they should be obtained from other South African Colonies; I should not import from over-sea at present. I am told that in North-Western Rhodesia there are a lot of cattle to be bought cheap; also in North-Eastern Rhodesia, in the Fort Jame-

son district. As soon as ever the restrictions on the movement of cattle are suspended the Company should have their cattle ready to move down; they must be secured in advance. Trained oxen must be bought, also mules, donkeys, some native and Persian sheep, a few goats, poultry and implements; in fact, the farm must be stocked and it must be left to the Manager of the settlement to buy what he considers necessary.

Stock should be supplied to settlers at market price, and they should have the use of stud animals on the farm at a reasonable fee.

It will be necessary to erect one, or perhaps two, tanks for dipping; one, probably, near the homestead, and one might be placed on the main road or track on the outside of the farm, so that it could be used by settlers.

A dairy must be got into working order as soon as possible, and when the farms round are taken up arrangements can be made to deal with all the cream or milk, the butter being marketed in bulk, eventually making this a branch of co-operation.

Settlers should be able to obtain seed of improved varieties from the farm, and, if the Company approves of my suggestion of making this an experimental station, they will have the work and results always under their observation.

Settlers who come out might be given the option of working on the central farm for a year, receiving instruction and board and lodging in return for their work; or they might be charged for board and lodging, and be paid for their work; the farm would thus be an educational centre.

I would propose to cultivate 20 or 30 acres on each holding before settlers take them over and, if possible, get up a hay-rick or two. Settlers who are resident on the central farm should be employed, as far as possible, in the development of what will eventually be the land they will occupy; as they will have to pay for this development work when they take over the holdings, they will work all the harder.

When they enter on their holdings the Manager should give the settlers assistance and advice, constantly visiting them, taking care, however, not to nurse them too much, and seeing that they do not rush into all sorts of useless experiments.

The most important point in the housing of settlers is the selection of site; for this reason I do not recommend the erection of permanent houses straight away; a man, after he has lived on his farm a year, is in a better position to judge which is the best spot for the homestead. It will have to be considered what class of temporary house to erect. I am inclined to think galvanised iron huts, which could be lined with green brick and roofed with zinc, with a layer of thatch over, might answer the purpose; these huts only weigh about 400 lbs. and are easily moved, so that they could be transferred from farm to farm as soon as permanent houses had been erected to replace them. The cost of these, exclusive of erection and thatch, would be :—

|                             |                    | For thatch<br>only. | With iron roof for<br>thatch on top. |
|-----------------------------|--------------------|---------------------|--------------------------------------|
| A reduction for<br>quantity | 12 ft. diameter    | £14                 | £20                                  |
|                             | 16 ft.     "     " | £25                 | £32                                  |

The 12 ft. hut has one and the 16 ft. has two windows; height to eaves is 8 ft. The settler would be charged, say, £2 per annum rent, and if he cared to purchase, the expenditure would be classed as an "improvement."

For the benefit of the settlement a general store should be started; this store should supply the necessities of life (other than what can be grown), implements and all farm requisites. The store should also purchase farm produce of all descriptions from settlers, which, under agreement, should all be sold through the Central Farm Manager.

The whole of this business should, as soon as possible, be made co-operative, and should then be managed by a Committee consisting of the Central Farm Manager, Sub-Manager, and certain of the settlers, who should be appointed by the general body of settlers, all of whom should be shareholders.

The smaller the holdings, in reason, the better for the prosperity of the country; it is men on the land who are wanted, and the man who begins in a small way, who manages his own business and sticks to it, is the man who will forge ahead.

Farms must be set out according to the lie of the country, taking into consideration the nature and quality of the land and its adaptability, possibilities of irrigation, etc.

This division of farms is of the greatest importance. The Irrigation Engineer should inspect the block of land



and indicate what areas can be placed under irrigation, so that a fair proportion of same can be allotted to the different farms.

As I have already said, the smaller the holdings, in reason, the better. I am in favour of making farms 1,000 to 1,500 acres; the smaller holdings of 500 to 600 acres will not be many, but in allotting large areas of land there will be farms of this size—in fact, of all sizes. The country with its many valleys—some large and some small, some with more water than others—lends itself to such division, so that all comers will have a chance of finding a suitable holding. On the small farm a man could go in for more intensive cultivation, such as tobacco, fruit, vegetables, etc.; and such a man as a blacksmith, carpenter and wheelwright, bricklayer, and any man who would engage his spare time in such a trade, *on the settlement*, could also occupy a small farm. Whether farms are large or small, I recommend a man to go in for mixed farming; he won't then have all his eggs in one basket. Men who wish to make market gardening their business should also grow corn and keep some stock, and combine market gardening with farming. The existing markets in the country for garden produce are limited at present, and transport and carriage by rail to the other Colonies is a matter for organisation; it will come eventually, but gradual development must take place.

The 1,000 to 1,500 acre farm, with, say, 15 to 20 acres of irrigable land, would have also up to 200 acres of land which can be put under the plough. All farms should have enough agricultural land to keep at least one span of bullocks fully employed. The 2,000 acre farms and upwards would be principally stock farms.

In the Orange River Colony the size of farms is as follows:—At Westminster, farms are 850 to 1,000 acres; at Petrusberg (more of a stock country), 2,800 acres to 4,000 acres; and the Manager states even 4,000 acres does not allow room for reasonable increase in stock after a few years. In the Bethlehem district the agricultural farms are about 1,400 acres, and the grazing farms 2,800 to 4,000 acres. In the Thaba 'Nchu district the 1,000 to 1,500 acre *agricultural* farms have not been successful, being dependent on the rainfall; other farms are 1,600 to 3,000 acres according to their capacity for carrying stock.

It will be seen, therefore, that for stock farming considerable sized holdings are considered necessary in the

Orange River Colony, and that it is important, if not essential, to have means of irrigation where agriculture is carried on.

Farms should be allotted and roads made so that homesteads are grouped so far as is possible, for the sake of society, education of children, mutual assistance in the home or on the farm, and to facilitate the work of those who have to look after the settlers and assist them.

I am told that May is the best time for settlers to arrive, *i.e.*, if they go straight to their holdings. I do not see that it matters when single men, who are to work on the Central farm, go out. It would, perhaps, be advisable to get one or two out as soon as operations are begun; they would be useful and have an excellent experience. The man who arrives in May has time to get settled, secure labour, get his farm stocked, and, as soon as the rains come, he is ready to commence ploughing; if some ploughing has been done in advance all the better, he can begin working his ground earlier.

The districts which I have inspected, and in which are large blocks of land suitable for "settlement" are—Lomagundi, Rusapi and Fairfield, Umtali and Marandellas.

All these blocks are in Mashonaland. I also inspected land in the vicinity of Gwelo and Bulawayo, in Matabeleland.

There is practically unlimited land in this district. The Police farm at Sinoia could be used as the central farm; it has been partially developed, but is now lying idle. In recommending this district, I assume, of course, that the line of railway to the Eldorado Mine will be built.\*

A fine tract of country, about 5,000 ft. above sea-level, would be from, and including, the northern block of farms at Rusapi, and embracing the southern block, some intervening farms, the Mashonaland Development Company's Estate, Southern Fairfield, Percyvale, and the Railway Block.

A good proportion of the land available on and around the Premier Estate can be put under irrigation. The question of market in this district must be borne in mind, and it is a question whether here or at Lomagundi there will be the best local demand. Umtali district is, I believe, about the same level (Umtali is 3,550 ft. above sea-

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\* I have since heard that this has been done.

level) as Lomagundi, and, therefore, there would not be much difference from the health point of view.

There is a fine block of land at Marandellas, 5,660 ft. above sea-level; undoubtedly, it is a healthy district. Here, again, local markets would probably not be so good as at Lomagundi, but for export the position is certainly better.

In my opinion, Lomagundi or Marandellas would be the most suitable for the first settlement. If it were possible, I should very much like to go over each of these districts again, with the Irrigation Engineer, if it is decided to employ such a man.

The price of farms must depend on locality, quality of land, amount of land which it is possible to put under irrigation, size of holdings, etc. I think it is advisable, if alternate blocks are reserved as suggested, to charge as low a price as possible for the land for the first year or two.

I have gone carefully into this question, and I put the amount at £700. For most men this amount would be sufficient, for some it would be inadequate; all depends on the man.

This amount includes passage out, erection of temporary house, furniture, implements, harness, stock, seed, wages, poultry, rent, food for first year for himself and family, and £70 for extras.

Fencing should be encouraged, but I should in every case reserve the right to adjust boundaries of farms any time during the first two years of occupation. The class of fence to be used should be specified and approved by the Manager.

Whether steam cultivation will be economical in preparing land for settlers will depend upon the nature of the country. There are, no doubt, large areas in which steam tackle would do good work; again, on the other hand, there are parts of the country unsuitable. In any case I should not recommend going in for a set of steam tackle until the Company can see their way more clearly. What can be done by deep cultivation, more particularly in dry seasons, has been satisfactorily proved in the Orange River Colony and in the Transvaal, and should the land selected for Land Settlement be suitable, the Company may have to invest in a set of steam tackle, say, next spring, by which time they will know more about their plans.



Undoubtedly the cheapest form of cultivation is by oxen, the Company, therefore should breed large numbers of cattle for settlers, and these should be used as far as possible to start with.

Special quotations should be obtained from the Steamship Companies, *viâ* Beira. I suggest that settlers deposit the full amount of the third or second-class fare with the Company in London, and as soon as they are settled on the Company's land they should be refunded the difference between the full and special rates.

The Railway Companies in Rhodesia are at present charging quarter fare to *bonâ fide* farmers, and quarter rate on their luggage, household effects and live stock.

Clause XVI. (a) in Permit of Occupation should be enforced. This restricts the cutting of timber other than for building and domestic purposes.

It should be part of the business of the Central Farms to supply trees of approved varieties for the planting of waste land on the settlements and elsewhere.

In the following table are shown some of the principal imports into Rhodesia from "over-sea," also from other States in the Union, for six months ended December 31st, 1905, and the amount of such imports for the year ended 25th March, 1905:—

(Where 1905 totals are not obtainable I have inserted 1904.)

|  | From over-sea and<br>from other States in<br>the Union :<br>six months only. | Total for one<br>year ended<br>25th March,<br>1905. |
|--|--|---|
| Butter, Margarine, &c. ....            | £6,132   | £14,946   |
| Cheese ....                            | 1,735  | 3,194   |
| Jams ....                              | 2,072  | 8,208   |
| Maize ....                             | 3,200  | 3,720   |
| Maize Meal ....                        | 3,920  | 2,651   |
| Oats ....                              | 1,124  | 41,386  |
| Wheat Flour or Meal ....               | 15,296   | 1,816   |
| Bran ....                              | 1,007  | 2,612   |
| Eggs ....                              | 640  | 11,683  |
| Fruit (all sorts) ....                 | 6,224  |   |
| Beef ....                              | 432  |   |
| Mutton ....                            | 954  |   |
| Meat (salted or cured, chiefly Bacon)  | 3,535  | 31,600  |
| Meat (tinned) ....                     | 8,192  |   |
| Milk (condensed) ....                  | 4,526  | (1904) 13,762                                       |
| Onions ....                            | 1,461  | (1904) 3,316  |
| Potatoes and Seed ....                 | 2,377  | (1904) 5,886  |
| Vegetables (tinned) ....               | 573  |   |
| Other fresh Vegetables...              | 1,034  | (1904) 3,111  |
| Tobacco (including Cigarettes, £5,192) | 10,393   | 20,758  |
| Lard ....                              | 1,191  | —   |
| Tea ....                               | 2,411  | —   |
| Sugar ....                             | 5,721  | —   |
| Coffee ....                            | 1,958  | —   |

In reviewing the returns comparatively for 1904 and 1905, the Controller of Customs draws attention to the following decrease in specific imports in 1905:—

|                |     |     |     |     |     |     |     |         |
|----------------|-----|-----|-----|-----|-----|-----|-----|---------|
| Maize and Meal | ... | ... | ... | ... | ... | ... | ... | £31,488 |
| Oats           | ... | ... | ... | ... | ... | ... | ... | 4,945   |
| Meat (frozen)  | ... | ... | ... | ... | ... | ... | ... | 6,320   |
| Salted Meat    | ... | ... | ... | ... | ... | ... | ... | 13,441  |
| Tobacco        | ... | ... | ... | ... | ... | ... | ... | 8,579   |

He remarks that, as there is no appreciable decrease in the population of the country, the requirements have been met more largely by local producers. This is satisfactory as far as it goes.

I would, however, call attention to the following totals of one year's approximate imports of some of the principal products which farmers in the country might produce:—

|  |     |     |      |         |
|--|-----|-----|------|---------|
| Dairy Produce, Butter, Cheese and Milk | ... | ... | say, | £24,500 |
| Wheat (flour or meal)                  | ... | ... | "    | 30,000  |
| Meat (tinned)                          | ... | ... | "    | 16,000  |
| Beef and Mutton (fresh)                | ... | ... | "    | 2,600   |
| Meat (salted, chiefly Bacon)           | ... | ... | "    | 7,000   |
| Onions, Potatoes and other Vegetables  | ... | ... | "    | 11,000  |
| Tobacco                                | ... | ... | "    | 10,000  |

## Paspalum Dilatatum.

*Paspalum Dilatatum*, or, as it is variously known, Hairy-flowered *Paspalum*, Large Water Grass, and Golden Crown Grass, originally a native of South America, is now attracting considerable attention here in South Africa.

It is a coarse leafy perennial, with a tendency to grow in clumps, attaining a height of two feet and over; in more favourable localities even reaching six feet. Though growing to greatest luxuriance in black alluvial soils, it thrives well on any good moist land, and even with some success on soils of a sandy nature.

By reason of its exceptionally deep roots, some even going down to a depth of three feet, it has a remarkable capacity for withstanding conditions of drought, which quality makes it a reliable feed for dairy cattle in the winter months. Moreover, when once established, it is indifferent to frost, unless it be a long continued frost, which is rarely experienced in Rhodesia, and is in fact a pasturage eminently suited for cultivation in tropical and sub-tropical climates.

As a permanent pasture *Paspalum Dilatatum* holds a high position among tropical grasses. In Australia it is considered to surpass all other grasses of a permanent nature for fattening stock and increasing the milk supply. Cattle are particularly fond of it, as, in spite of its luxuriant growth, its tissues are soft and succulent. Moreover, stock may trample it down and eat it off without in any way injuring its growth. Young pigs that have been depastured on a patch of *Paspalum Dilatatum*, in addition to the morning and evening feed of skimmed milk, have grown unchecked to maturity, and needed but a week or so of corn feeding to secure the most profitable results when marketed.

Again to enumerate yet another of its excellent qualities, *Paspalum Dilatatum*, by its deep rooting and drought-resisting nature, is enabled to get such a hold in the soil that in new lands it eventually subjects all noxious weeds, that so readily grow in our fertile soils, while in old lands it may be said to be a certain prevention. As hay, *Paspalum Dilatatum* is rather coarse, though sweet, but when properly saved it is of an excellent quality, especially valuable to the dairy farmer, who will find it an excellent supplement to his other forage crops on which he relies to keep his milch cows in good milk during the dry winter months.

*Cultivation.*—There are two methods of sowing *Paspalum Dilatatum*, that of sowing in the place where the crop is to grow, and that of sowing in seed beds and subsequently planting the roots out. Of the two the latter is undoubtedly the best and most satisfactory method, though it involves greater labour, but should, when possible, be employed owing to the present difficulty of procuring reliable seed. The seeds should be sown after the first rains to save the trouble of watering the seed beds, and the plants should be planted out on a dull rainy day when they have grown sufficiently large to handle easily and with sufficient roots developed to transplant without risk. In preparing the land for the plants it is best to plough a furrow 3 to 4 inches deep, in which the plants are set, 4 to 5 feet apart, and then covered with another light furrow. This planting out can soon be learnt by a fairly intelligent native, as the plants are not delicate to handle, and their rooting power is undoubtedly great.

For sowing in situ, first thoroughly plough and harrow



the land, then sow at the rate of 8 to 10 lbs. per acre, and run a light brush harrow over the seed, just to cover it; if sown too deep a large percentage will not germinate. The period of germination is about three weeks.

Stock may be allowed to feed on it when the plants are from three to four inches high. Light cultivation between the rows is recommended in the early stages. The first crop should be allowed to seed itself, and a thick crop may be expected to follow. The collecting of seed from *Paspalum Dilatum* requires a different treatment to that usually employed with other similar grasses. The seed takes about three weeks to ripen, the seed ears being at all stages of development simultaneously. The usual method of reaping and beating out the seed does not give satisfactory results, a large proportion in this case being unripe. The process of "hand-shaking" must therefore be resorted to. This consists of gently shaking the ripe seeds into a dish, leaving the unripe ones to mature, when the process is repeated till sufficient seed has been obtained, those collected during the first days of ripening being the best. A good indication of the quality of the seed is its weight per four bushel sack, which should not scale under 112 lbs. Though not actually tested in this country, *Paspalum Dilatum* has proved such an excellent pasture in Australia that it behoves the enterprising farmer, and especially the dairy farmer of Rhodesia, to give it a thorough trial. The absolute necessity of providing winter crops for stock and dairy cattle is more thoroughly realised each year, and this grass, with its high feeding value and its drought-resisting properties, makes it eminently suitable for the most serious and attentive experiment.

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## Notes on Citrus Culture.

(Continued.)

By R. McILWAINE, M.A., LL.B.

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### II. PLANTING THE TREES—(Contd.)

Citrus trees have several growing periods in the year, consequently they may be transferred from the nursery to the grove during any of the intervening times of dormancy. It is well, however, to select a time for trans-

planting likely to be favoured by subsequent weather conditions suitable to the growth of the young trees. When the trees are set out during the winter months in Rhodesia, the dry air of this season and the unclouded sun from day to day may severely strain the powers of the young trees unless they are furnished with artificial shade and freely supplied with water. On the other hand, if transplanting can be effected during the rainy season, more especially in January and February, when a dormant period may generally be found, the humid atmosphere and the rains will render little care necessary beyond a thorough irrigation of the trees when planted in the holes made to receive them, in fact, when planted at this season they will generally commence growth a few days after removal, without having lost a single leaf in the operation. If the weather conditions are not favourable when transplanting has to be done, it is a good plan to lop off at least one-third of the younger branches, and to shade the tree as a protection from the sun until sufficient foliage has been produced to render this unnecessary.

Before planting the trees all injured roots should be pruned back with a sharp knife, a clean cut thus made soon heals over, and the mangled roots that have been removed are quickly replaced by an abundance of young healthy rootlets.

In digging the holes for the young trees it is well to keep the surface and sub-soil apart, so that a quantity of the former can be filled in first in immediate contact with the roots, affording the most favourable conditions for starting growth. When about one-third of the soil has been replaced round the young tree, a bucketful or two of water—the quantity will depend on the condition of the ground—should be poured into the hole. This will cause the earth to set uniformly and compact about the roots, and enable them to derive sustenance therefrom without delay. Having secured an ample supply of earth in the immediate vicinity of the roots, the balance of the earth should be returned to the hole, and if it is possible to place a layer of dry pulverised earth on the surface, the moisture retaining capacity of the lower layers will be greatly prolonged. It is a serious mistake to irrigate young trees by pouring water on the surface of the ground, unless a mulch is provided as soon as it has soaked in; if no such mulch is

furnished the ground soon cracks, affording an easy means of escape of the moisture by evaporation.

When trees planted in the manner here recommended require a further supply of moisture pending rain, the best course is to remove the surface layer of earth round the trees; the water is then poured in the depression thus formed, and when it has penetrated the soil the mulch is replaced.

In planting trees the soil should cover the stem to the height at which it stood in the nursery. This point cannot be mistaken. However, to allow for subsidence of the loose earth the trees should be planted a few inches higher than the general ground level. To plant citrus trees in depressions is to invite *mal-di-gomma* or collar rot.

In a country like Rhodesia, where citrus growing is in its infancy—a promising infancy—it would be most helpful if planters, on setting out their trees, would keep a careful record of their names either by permanent labels or maps. This would soon enable us to decide upon the varieties most likely to succeed.

So many young citrus trees receive such a severe setback from the depredations of the Orange Dog (*Papilio Cresophantes*) that this appears the proper place to caution those who would retain the uniformity of a young grove to be on their guard against this pest.

In the bright sunshine a gaily coloured black and yellow butterfly may be seen hovering about the grove and occasionally descending upon the tender shoots of the trees. An inspection of the shoot thus visited will show that a small pearl looking egg about the size of a pin's head has been deposited. From this the larva is soon developed. It quickly assumes considerable proportions, and its appetite is so insatiable that in two or three days it despoils the whole foliage of a small tree. This disagreeable looking caterpillar is easily known by the two feelers which it protrudes when disturbed, and the pungent odour which it emits when bruised. A spraying with Paris Green will destroy the larvæ, but I consider it the best plan to detail a native to pick them off the young trees. On full-grown trees the damage done is scarcely appreciable.

It is calculated that the female butterfly deposits as many as four hundred eggs, and that there are several broods in the season.



## III. CULTIVATION OF CITRUS GROVES.

The benefits arising from the tillage of the soil, whether for the ordinary agricultural crops or the orchard, are generally recognised, but in looking to these benefits it is well to consider whether injury may not result from a system of cultivation which deprives a grove of all herbage without interruption.

Cultivation is beneficial in increasing the capacity of the soil to receive water and in retarding evaporation; it opens up the soil for the admission of oxygen to the roots, and facilitates the spread of these roots in search of food, and liberates the nourishment locked in the ground. The drawback to continual cultivation in a sub-tropical climate consists in the uninterrupted exposure of the soil to the burning heat of the sun. Such exposure and the absence of a natural covering of plant life results in the exhaustion of the humus in the soil, and if humus be absent the ground is lifeless, and no amount of fertilisers will compensate for the loss of natural fertility attendant on the presence of humus. The bacteria in the soil play an important part in the supplying of plant food, and in their absence very little of the nitrogen present in substances which contain it is rendered available. When, therefore, it is realised that the bacterial content of the soil is chiefly dependent on the humus contained in it, the importance of conserving and keeping the latter element will be realised. It is in the humus that the bacteria work, and in it the plant food set free by them is conserved until used up.

In Rhodesia the object should be to provide such a condition of the soil as will result in as many of the benefits as can be secured by cultivating without exposing the ground to the wasting influence of the burning sun and winds. In the case of unirrigated groves it is most important to provide conditions which will absorb an abundance of rainfall, and thereafter render it gradually available for the use of the trees, without depleting the soil of the life giving humus. Some advocate frequent cultivation of the ground during the rains in order that they may permeate the soil, and when the rainy season is over frequent shallow cultivation to prevent evaporation. Regarded from a moisture point of view this course has everything, to commend it, but as continuous clean

cultivation must result in a state of comparative barrenness, it is suggested that a better method is to plant a good cover crop in the grove early in the rainy season, to be turned in before the rains are over and while there is an abundance of moisture to secure decomposition. Such a crop will result in the addition of humus to the soil, thereby increasing the water-holding capacity, and supplying a workshop for the bacteria. In many of the soils of this country a few minutes of driving rain renders the soil so compact that only a small portion is absorbed; when the rain is over, a few hours sunshine bakes the soil and provides numerous cracks for the escape of the little water taken in. Under these circumstances not only is there a loss of moisture, but also a loss of fertility through leaching. A cover crop breaks the force of the driving rains, enables the soil to take a greater portion of them up, and retards wasteful leaching. Further, if a leguminous crop is grown for cover purposes it will also supply plant food. When the cover crop is ploughed in towards the end of the rainy season the deep working of the soil entailed thereby will result in a good aeration of the soil. The moment the rains are over shallow cultivation should be undertaken to retain the moisture. This will be carried on throughout the dry season, with the satisfactory knowledge that the cover crop has supplied a greater wealth to the land than can be drawn off by the deleterious effects of sun and wind on the exposed surface.

The favourite cover crops belong to the leguminous family, which includes the various kind of beans and peas, lucerne, beggar weed, and many others. Personally I consider the ordinary spreading variety of bean grown by the local natives well suited for cover purposes. This bean appears to be rich in the root nodules, which indicate the presence of the nitrogen fixing bacteria.

Such crops as buckwheat, rape, etc., do not collect nitrogen, and when returned to the soil do not give back more than they have withdrawn therefrom, but otherwise they possess all the beneficial qualities of leguminous cover crops.

It has been found in Florida that the turning in of cover crops while green often results in an acid condition of the soil, prejudicial to the growth of the trees. Experience has not yet shown whether the same conditions apply here. They can, however, be obviated by

allowing the cover crop to rot partially on the surface before turning it in. A further drawback to repeated cover crops of a leguminous nature is the production of an excess of nitrogen in the soil which is liable to cause *die-back* in the trees; this can be obviated by increasing the quantity of potash in proportion, or by using cover crops not calculated to produce an excess of nitrogen.

In situations where artificial irrigation of groves is possible and considered necessary, if no attempt is made to retain the natural moisture of the soil by shallow cultivation throughout, the ground flooded by the irrigation should not be allowed to cake when the water has been withdrawn. A thorough cultivation of the ground, when sufficiently dry, should follow the application of water.

*(To be continued.)*

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## Tomato Culture.

*(Contributed.)*

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If this were the silly season one might be tempted to start a discussion as to whether the Tomato, or Pomme d'Amour, as the French call it, is a fruit or a vegetable. So attractive is the beauty and so refreshing the taste of this popular esculent that many people eat it freely in its raw state, just as one might eat plums or peaches. When such a firm fleshed kind as the Peach-bloom is procurable one might well be excused if one treated it as a fruit and not a vegetable. Most tomatoes are, moreover, exceedingly ornamental. It is not at all a new thing, where tomatoes are plentiful, to see the dinner-table decorated with racemes of the smaller crimson and amber-coloured tomatoes. In such a climate, too, as ours, all varieties grow in profusion without any of the precautions and provisions necessary in colder climates; and yet it is quite a common thing to see the most miserable specimens exposed for sale—soft, pulpy, uninviting looking things, usually bruised, or cracked, or with patches of an





Tomatoes.



unhealthy yellow quite unlike the rich crimson gloss we ought to see. Moreover, the flavour, instead of being juicy and fine, is often acrid or over sweet, with a strong suspicion of decay.

That this should be the case in a country where tomatoes will grow almost wild and in great profusion is much to be regretted. With the exercise of a little care in looking after the plants in their various stages of growth, tomatoes can be grown equal to anything produced in the more highly equipped gardens in England or America. Our illustration bears this out. It is of a crop of Suttons' Peach-bloom tomatoes, grown on indifferent sandy soil, with no manure, save that trenched the year before.

The supply of fine fruit was abundant and well sustained. This need only be compared with the usual straggling appearance of plants that are allowed to lay on the ground, and the fruit of the one set side by side with that of the other to show what results a little intelligent work and care will produce.

Though seed can be saved, and though tomatoes will even seed themselves, it is better to invest in some one or other of the excellent seeds sold by the various seedsmen. The writer has found Suttons' Peach Bloom and Perfection two of the most prolific and satisfactory of the large red kind. Ponderosa and Champion are equally good, while of the yellow tomatoes perhaps the Golden Queen. There are a great many varieties of different sizes and colouring; some of the smaller kind, shaped like eggs, are very good for preserving whole, and the contrast of the gold and red tomato in syrup makes an extremely pretty and inviting jam or preserve. Tomato jam, as some of our Rhodesian housewives make it, flavoured with ginger and cinnamon, is equal to any of the imported varieties. In short, the tomato is one of the easiest grown and at the same time the most useful of our vegetables. A few notes on its culture may thus be of interest.

The first consideration is the soil. In this the grower is fortunate, as tomatoes will thrive in almost any kind of ground. Naturally a deep rich soil is the best, but any moderately good loam, even the sandy loam, will produce good results. Perhaps the ideal ground formation is a mellow loam, with just a little sand in the top soil, and a good stiff clay subsoil, which will hold the water and re-



turn it to the plants when needed. But damp stagnant ground must be avoided. Too much moisture causes black rot. In such soil the only remedy is deep thorough trenching and draining. Manure is not necessary; in fact fresh stable manure should be avoided. Too much manure produces great growth of foliage at the expense of the fruit. A good plan, however, to bring on the green fruit is to apply small quantities of liquid manure, while to hasten the early fruit a discrete defoliation of the leaves is permissible. The seed, which is best sown in boxes, should be dropped separately in drills, leaving sufficient distance for the plants to come up well apart. The value of this can at once be seen if two sowings are made, one broadcast, the other carefully in rows with due spaces. While the one gives a crowd of lanky, undeveloped plants, the other will show good sturdy youngsters, a bit short, but with strong stems and firm even branches. Moreover, in transplanting the ease of handling is at once noticeable. To maintain a succession of crops periodical sowings should be made. Before planting out it is well to thoroughly soak the beds, so that each plant can be moved with the earth still sticking to it. Set the plants down gently into their places, put fine soil nicely round, then press gently to fill in well round the roots. A good distance is 2 feet apart in the rows and 4 feet between the rows, but this must depend on what growth is to be allowed each plant. As soon as the plants are about 12 to 15 inches high set in stakes quite close to the stalk in the line of the rows, and starting up continue the process as they grow till about three feet high, when they should be topped, just above the last fruit cluster you intend to leave. All laterals should be pinched out when one inch long. Soon you must decide how the plant is to be allowed to grow. According as you decide, so you may leave the main stem and one, two, three, or four suckers. The neatest plan is to leave the main stem until just below the first or second cluster, where it is sure to fork, and, if desired, a sucker on each branch. These admit of easy tying, and allow of ready handling when necessary to pay attention to any particular cluster. It is always a mistake when fine fruit is desired to allow too much to grow. Prune until you have enough fruit and then top. If early tomatoes are desired leave only a few clusters. Expose the fruit gradually so as not to check the plant,

and never sacrifice the shade the leaves are meant by nature to afford.

Planting in furrows admits of easy watering, which should be regular and never excessive. An occasional application of liquid manure is an excellent stimulant to the fruit, while the plants will always keep in better condition if the ground is constantly cultivated.

Such is the ordinary method of cultivating tomatoes. It may be that an early supply is desired, then it is advisable to raise the early plants under cover, and then plant them out as soon as the frost is over. Frost is an enemy to tomatoes, but a winter crop can easily be grown by making some provision to cover the plants at night, such as a simple limbo structure that can be opened during the day. Should it be desired to place tomatoes on the market, a little care and common sense is all that is needed; only perfectly sound specimens should be chosen, and these picked carefully and placed in a basket with something soft at the bottom. One bruised tomato will quite likely contaminate the lot, as it rapidly turns black and sets up rot. The stems should be rubbed off and the fruit wiped clean and dry, and stored in some shady place. Remember tomatoes are a soft, easily bruised fruit, and such a process as pouring them out from one vessel to another is fatal. Careful handling must be insisted on.

In conclusion, the writer ventures to recommend farmers and gardeners to grow more tomatoes, and with more care. In other countries where the conditions are not nearly so favourable for growing tomatoes as here in Rhodesia vast quantities are grown and marketed all the year round. That such a thing as a tinned tomato should be sold in this country is a reproach to Rhodesia. At the best, it is a poor substitute for the fresh article, and where fine fresh fruit is procurable all the year round, such a thing as a tinned tomato should never be known.

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## Tobacco.

We publish the following list of prizes offered for tobacco at the Western Province Agricultural Society's Show to be held at Rosebank on the 19th, 20th, and 21st February, 1907, in the hopes that they may prove of interest to tobacco growers in this country:—

| CLASS. | TOBACCO.   | PRIZES. |
|--------|--|---------|
| 538    | Best 25 lbs. Transvaal Tobacco, in leaf (representing not less than 1,000 lbs.) ... ..                 | £2 10 0 |
| 539    | Best 25 lbs. Transvaal Tobacco, in roll (representing not less than 1,000 lbs.) ... ..                 | 2 10 0  |
| 540    | Best 25 lbs. other South African grown Tobacco, in leaf (representing not less than 1,000 lbs.) ... .. | 5 0 0   |
| 541    | Best 25 lbs. other South African grown Tobacco, in roll (representing not less than 1,000 lbs.) ... .. | 2 10 0  |
| 542    | Best 1,000 Cigars manufactured in South Africa from South African Tobacco ... ..                       | 2 0 0   |
| 543    | Best 1,000 Cigars manufactured in South Africa from Imported Tobacco ... ..                            | 2 0 0   |

### SPECIAL PRIZE.

(Offered by Messrs. Hermann and Canard.)

544.—For the best 50 lbs. Bright Yellow Leaf Tobacco (representing not less than 2,000 lbs.) Leaf to be bright yellow, well cured, well selected in colour, and of uniform size. Length of leaf to be not less than 20 inches, and width not less than 8 inches. The burning quality must be white, and the leaf must not have been broken off from the trees by hand, but cut off with a knife or scissors. 2,000 lbs. of same quality as sample exhibited must either be in possession of the Exhibitor at the time of the Show, or he must be able to prove that same has been sold to manufacturers ... .. £5



## East Coast Fever.

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The following article is published by the courtesy of the Natal Department of Agriculture, and should prove of value to stock owners:—

In view of the spread of this disease outside of the quarantined areas of Zululand and Vryheid, the large movement of stock and the relaxation of restrictions which have taken place in consequence of the Native Rebellion, I deem it necessary to state briefly, for the information of our stock owners, the cause, nature, and course of the disease, practical measures of prevention, and the valuable assistance which they may give to the Department.

East Coast Fever is caused by a special parasite (*Piroplasma*), which invades the red cells of the blood, and it is a disease peculiar to bovine animals. It is not directly contagious from one animal to another, *i.e.*, a sick animal will not infect another susceptible animal by intimate contact as is the case in Rinderpest and Lungsickness.

The disease is communicated solely by ticks; but only by those ticks (the brown and the black) which, in one of their intermediary stages, have fed on affected animals, and are thereby made capable of communicating the disease to other cattle. The ticks responsible for communicating this disease exist generally throughout Natal, and only require to become infected to spread the disease.

### NATURE OF THE DISEASE.

East Coast Fever is a disease which, by reason of the causal agent affecting the blood, resembles in outward symptoms many other diseases prevalent in this Colony, such as Gall-sickness and Redwater. The blood being the primary seat of the malady, lesions may be found in many organs of the body; the spleen, the liver, the kidneys, and the true stomach are, however, the chief seats.

During life, animals affected do not show in the majority of cases any very characteristic symptoms; high temperature is the first evidence of the disease. The animal is dull, droops its ears, and shows a dribbling from the mouth, but in many cases continues to feed well on

in the disease. It is due to this continued feeding that many cases are overlooked in the early stages, and are reported to have died suddenly. Other cases show marked symptoms; great depression, constipation followed by diarrhoea, weakness of the loins, and a tendency in some cases to charge. Where the lungs are affected, symptoms of lung-sickness are shown. In the average case, the symptoms are very similar to those of gall-sickness. There is no discolouration of the urine unless ordinary redwater exists as well as East Coast Fever, the two diseases running together; such cases are not uncommon. Any animal showing symptoms of either gall-sickness, or redwater, or those which might be suspicious of East Coast Fever in a district where there is any chance of the infection existing, should be considered as suspicious of East Coast Fever. In fact, any case of sickness amongst cattle, or any deaths in such districts, ought to be considered suspicious, and blood should be forwarded for examination, as mentioned hereafter. Owners must not rely upon any particular symptoms in determining whether an animal is or is not suffering from East Coast Fever, as even those experienced in the disease are not in a position to say positively that it is or is not East Coast Fever, merely from the outward symptoms shown by the sick animal.

### POST MORTEM LESIONS.

These vary considerably, depending upon the stage of the disease. If an animal be destroyed a few days after being noticed sick, nothing beyond a slight enlargement of the liver and spleen may be found. A typical case which is not commonly met with even where an animal has died from the disease, shows a well marked yellow pigmentation of the membrane covering the intestines dotted here and there with blood spots. These blood spots may exist generally on the surface of the intestines, stomachs, gall-bladder, etc.

The fourth or true stomach is the seat of acute inflammation more in the form of numerous blood spots than the diffused inflammation seen in cases of rinderpest. Ulcers may be present in this organ. These blood spots are frequently present in large numbers throughout the intestines, particularly in the small intestines.

The spleen is enlarged and softened in the majority of cases, but not so pulpy as in the case of anthrax. The liver is enlarged, and often has the appearance of having been boiled. The gall bladder contains a quantity of dark bile of a tarry consistency; and large blood spots and blotches exist on its lining membrane.

## KIDNEYS AND HEART.

The fat around these organs is frequently infiltrated with a yellow gelatinous substance. Blood spots are common on the surface of the heart. The kidneys themselves show, on removal of their capsules, what are termed Infarcts on their surface. These are small yellowish areas about the size of a split pea, or smaller, on the surface of the kidney, often raised above the surface, showing an inflamed area around their edges. These Infarcts are considered to be one of the most characteristic *post mortem* lesions, but many cases of East Coast Fever are met with where they are absent. The bladder and urine are usually normal.

## LUNGS.

When these organs are affected, their substance is infiltrated with a yellow exudate similar to that seen in cases of horse sickness. Pleurisy may exist, with fluid in the chest cavity; or the lungs may be attached to the chest wall. When the lungs are affected, and the animal dies, froth discharges from the nostrils, as in cases of horse-sickness.

It should not be supposed that the lesions just described must be found before the case can be declared to be one of East Coast Fever. When lesions of this nature are found, however, suspicion must always be attached to them, as should be the case with all deaths occurring, where there has been a suspicious history of possible East Coast Fever infection.

Stock owners must realise that, although we, who have had considerable experience with East Coast Fever, are frequently able to declare by *post mortem* lesions a case to be one of East Coast Fever, the only positive means of demonstrating the disease is by the microscope.



The following are the main points to bear in mind in connection with East Coast Fever:—

1. The disease is not directly contagious, but is communicated by ticks.

2. Animals other than cattle do not, except by the merest chance, carry the disease, for the reason that an infected tick loses its infection once it bites another animal, and as other animals are not susceptible to East Coast Fever, the tick cannot re-acquire the infection from animals other than cattle.

3. Infection may be carried by infected ticks existing in hay, grass, or bush removed from infected areas, but no case of infection has yet been traceable to this cause.

4. The disease is only carried by cattle actually suffering from East Coast Fever, by their distributing the infected tick where they go, or where they die. The infection left by infected travelling cattle is not nearly so great as that left by cattle which die, and the deaths at the commencement of an outbreak will accordingly be fewer in the former than in the latter case.

5. The period of incubation, *i.e.*, the period which elapses between the actual infection and the onset of the symptoms is, on the average, ten to twelve days; minimum ten days, maximum 18 days.

6. The course of the disease from its onset to death varies from ten to seventeen days.

7. With our knowledge of the incubation period, it may be stated that an animal may travel 200 miles by road after picking up the infection before showing symptoms, *i.e.*, allowing the average mileage to be fifteen miles a day. It is very unlikely to happen, but is theoretically possible.

8. The first indication of an animal being infected is a rise in temperature.

9. An animal or animals which bring infection to a farm or locality will develop symptoms within eighteen days of arrival, and die within thirty days.

10. Local cattle do not usually pick up the infection for six weeks to two months, and this period may be even longer. This period elapses on account of its being necessary for infected ticks to go through a moulting stage before they are again ready to attack a beast; and, of

course, the tick also has to take its chance of getting hold of a host even when it is ready to do so. This moulting period may be influenced by climatic conditions, so there is no very definite period to be stated within which further cases may be expected. It follows that the detection of the first case appearing in any locality is of the utmost importance, as, owing to other cases not occurring for weeks afterwards, the owner is very apt to attribute the first to some minor disease, and not report the matter, and thus infected cattle may be distributed to various centres. It is, I repeat, this detection of the first case which is so important if the farmer hopes to save the majority of his cattle.

11. Animals may remain on infected farms weeks or months before becoming infected, depending upon the area and amount of infection existing. This must not be confused with the incubation period.

12. In the case of fresh outbreaks, only a few animals may die at first, as the number of infected ticks is usually limited; but, as deaths become more numerous, infected ticks also become more numerous, and the death rate increases in proportion. It further follows that, if a number of sick animals exist, or deaths have occurred when an outbreak is reported, we know that the infection must have existed for some time, and that the great majority of the animals running on such infected farm are probably infected.

13. Infected veld remains infected for at least fourteen months after all the cattle have been removed, or after the last case of the disease.

14. The burning of the veld, while assisting in cleansing it, does not destroy the infection.

15. Grazing of animals other than cattle on infected veld hastens its cleansing.

16. Fully 95 per cent. of animals affected die, and 100 per cent. are susceptible.

17. Animals which have been running on infected veld for months must not be considered as salted. In the majority of cases, they will be found not to have become infected; but if left on infected veld will eventually contract the disease, and die.

18. Calves born on infected veld from recovered parents within fourteen months of the last case of the disease will contract the disease and die.

19. Salted animals are not a means of maintaining the infection.

20. There is no method of treatment or preventive inoculation known. Owners are often led to believe that various remedies are beneficial because their cattle apparently stop dying; but cattle left on infected veld will in the end contract the disease and die, no matter what treatment they are subjected to.

21. Dipping, while destroying all the ticks on an animal, will not remove the infection if a beast has already acquired it; and, as re-infection with ticks can take place a few days after the dipping, it will not prevent an infected animal carrying the disease into a clean area, as the ticks necessary for its spread exist generally throughout Natal. Such dipping may to some extent minimise the distribution of infected ticks *en route*, but does not prevent it.

22. Dipping, even if carried out weekly, will not greatly reduce the mortality from East Coast Fever, if the cattle are still exposed to infected veld. Experiments in the Transvaal proved that cattle dipped just prior to exposure to infection, and also during such exposure, contracted the disease as readily as cattle which were not so dipped. Dr. Theiler showed that cattle developed symptoms of East Coast Fever after fifteen days' exposure to infected veld, notwithstanding that they were twice sprayed during that time, proving that the infection must have taken place within the fourth or fifth day at the longest after such spraying, that is allowing for the minimum period of incubation.

23. Dipping, if carried out systematically and combined with fencing, will greatly lessen the risk of infection by reducing the ticks capable of carrying the disease; but as only one or two ticks are necessary to convey East Coast Fever, it will be apparent that this systematic dipping must be carried out for a considerable time to bring about such a result.

The following points suggest themselves in connection with precautionary measures:—

24. All deaths or cases of sickness amongst cattle at the present time, even in districts remote from known tick fever infection, ought to be viewed with suspicion.



25. Every endeavour should be made to ascertain the cause of such deaths, and, with this end in view, stock owners should make themselves acquainted with the method of preparing blood slides to be forwarded for examination. District Veterinary Surgeons and Stock Inspectors cannot investigate the death of every beast which occurs, but the result of examination of slides will offer as much information as a visit from a District Veterinary Surgeon or a Stock Inspector.

26. As it has been definitely ascertained that an animal in the early stages of the disease, and even up to the seventh or eighth day of sickness, may not reveal the causal parasites in satisfactory numbers in its blood, it becomes necessary, to make the diagnosis certain, to prepare and forward blood slides as often as possible, at intervals of a day or so, particularly during the last stages of a beast's illness. Slides prepared just before or immediately after death are the most satisfactory; but if the beast has been dead even for a few hours, and putrefaction has set in, an opinion is often impossible.

The following instructions as to how to prepare a blood slide should be observed:—

27. First, thoroughly clean the slide, then cut one of the small veins in the ear, allow the first few drops of blood to drip off the ear, then catch a drop of blood on the end of a cigarette paper or piece of tissue paper, shake off most of the blood from the paper, then apply the saturated end of the tissue paper flatly on one end of the slide and draw it along its full length, the idea being to make the blood film on the slide as thin as possible. Allow the blood film to dry (which it does quickly), wrap it rapidly in clean paper, and pack it carefully to avoid breakage in the post. Information giving the history and describing the symptoms should always accompany slides, and if slides from more than one animal are forwarded at the same time, they should be labelled by means of a piece of postage stamp paper pasted on the opposite side to the blood film to distinguish them. Slides will be supplied, upon application, free of charge, and they may be forwarded post free, addressed to—"Principal Veterinary Surgeon, Pietermaritzburg."

28. As the disease can only be carried, for all practical purposes, by infected cattle, it follows that, if stock owners take precautions to prevent stray cattle coming on to their

farms, such farms will remain free from disease. The only practical means to bring this about is for owners to see that their farms are fenced, that they have a record of all their native cattle, and to insist that no cattle are brought on to their farms by their natives or by themselves except under certain conditions, which will be specified later.

29. Transport cattle belonging to farmers, by reason of their travelling away from their farms, must be dealt with as strange cattle, there being no assurance that the roads over which they travel may not become infected by passing cattle.

30. The danger from such transport cattle, or from cattle which may be bought, and which an owner desires to bring on to his farm, can be overcome by, in the case of transport oxen, always keeping them in a separate paddock isolated from the rest of the cattle. In the case of bought cattle, they should be subjected to a period of 21 days' observation, their temperatures being taken daily in the early morning, and any showing a rise should be immediately placed in a stable, or in such a place that the ticks dropping from them may be destroyed. Blood slides should be sent at intervals during the period that the animal maintains a temperature, in order that it may be ascertained whether or not it is East Coast Fever. By this means any animals which may be infected can be detected, and, as 21 days is beyond the incubation period, and any showing a rise of temperature are removed as suggested, the remainder can with safety be allowed to go on to the farm. By removing an animal immediately on a rise of temperature, we prevent his infecting the veld. This is the principle of our temperature camps, which enables us with safety to remove cattle from infected to clean veld. An animal showing a temporary rise of temperature, which may happen due to other causes than East Coast Fever, should not be permitted to return to the veld or mix with the other cattle until it has shown a normal temperature for three or four consecutive days. It is essential that the temperature should be taken in the early morning; and a temperature of 102.5 to 103 should be considered a rise of temperature for this purpose.

31. A fence, while preventing cattle from straying on to a farm or being driven across it, will not prevent an animal from dying next to the fence or a sick animal from leaning

its head over it, and thus distributing infected ticks to the inside of the fence. For this reason, when the disease exists in an owner's vicinity, he should take measures to prevent his cattle from going right up to his boundary fence.

32. As the only possibility of saving cattle with the least possible mortality upon an outbreak occurring, is to remove them from infected to clean veld through a temperature camp as before described, owners should as far as possible paddock off their farms, and keep certain paddocks free from cattle, so that they may know for certain that they have clean veld to which to move their cattle. Such fenced paddocks may, of course, be used for any other animals. By this means, with the detection of the first animal affected with East Coast Fever, an owner may deal successfully with an outbreak with a loss of under 5 per cent., as has been our own experience in Zululand, where we have had to presume veld was clean, and where we had no fence to protect us. The great thing, after so dealing with an outbreak, is to prevent re-infection.

33. Cattle before removal to clean veld from infected veld should be dipped or sprayed whenever possible, and their temperatures taken. The dipping is to avoid the remote chance of an animal carrying an infected tick, without such tick actually attaching itself to the beast. As this chance is so small, this dipping or spraying is not absolutely necessary; but it is essential that all animals be temperatured the morning they are moved; and any showing rise of temperature should under no circumstances be taken to clean veld; but should either be destroyed (which is the safest course) or be placed under such conditions that they cannot infect veld. After removal to clean veld, every animal must have its temperature taken every morning for 21 days, and any showing a rise of temperature should be destroyed. I urge upon owners the desirability of at once destroying animals showing a rise of temperature where East Coast Fever infection is known to exist in a herd, as we know from experience that 99 per cent. of the animals showing a temperature under these circumstances are suffering from East Coast Fever, and will finally die. To attempt to isolate them is playing with the disease and facilitating its spread. What is a loss of 5 to 10 per cent. of the cattle



if thereby the remainder are freed from infection? The hides of such destroyed animals should invariably be disinfected.

34. Upon an outbreak occurring, it is of vital importance, in the public interest, to endeavour to trace the source of infection. This we are, with our knowledge of the incubation period and the duration of the disease, able to follow up, provided the necessary information regarding the introduction, or passing through a locality of strange cattle, is afforded. We know that the animal or animals which introduce the disease into a locality previously free from infection must have become sick within fifteen days after arrival there, or to have died within thirty days, and that if animals which have been bred and born on the place, or to which no doubt attaches that they have been there for a period of many months, are the first to be reported sick, such are not the source of infection, but this must be looked for in a death or deaths some two months previously. When the history of an animal recently brought to a place, dying within the period stated, can be traced, the next endeavour should be to ascertain the locality from which it came, and the route taken, and whether it arrived sick, took sick shortly after arrival, and died within a short period, say, ten to twenty days. If so, it should be presumed that the animal travelled in a condition capable of distributing infected ticks; and the route it took, with the resting-places on the way, should be viewed with grave suspicion, and be quarantined.

It is apparent that the chief danger to individual farmers, and of the spread of the disease generally, outside native locations, is the trek ox; and it will be found should the disease spread to any extent, to be this animal which will be the chief means of introducing the disease on to farms, particularly on to fenced farms. Owners who intend to take every precaution to guard against the disease, can only do so if they make up their minds that an animal once it leaves their farms must never return except under the conditions of isolation and temperature previously stated. This would be impracticable in the case of oxen constantly used to and from a farm; and it behoves stock farmers to consider seriously the advisability of replacing the trek ox with other draught animals not susceptible to East Coast Fever.





Ayrshire Cow.



It will be apparent that the practice of trekking for winter grazing to the low veld will have to be abandoned if a real endeavour is to be made to avoid infection. Apart from the danger of travelling along possibly infected roads cattle on Thorn farms are usually under indifferent supervision, the farms are usually unfenced, and in localities where movement of native cattle can go on more or less unhindered.

It is earnestly hoped that all stock owners will assist the Department in every way in their power to detect outbreaks of the disease, not only amongst their own cattle but amongst those belonging to natives in their vicinity, and that, with this end in view, they will make themselves thoroughly acquainted with preparation of blood slides, and will take every opportunity of forwarding these from any animal which may become sick or die in their locality.

East Coast Fever, being a disease which, under the most favourable circumstances, we shall have to combat for years, we must not relax our vigilance or become in any way apathetic should its spread be arrested.

Any farmers who desire a practical demonstration in the proper preparation of blood slides can have such arranged on application to myself or to any Veterinary Surgeon.

S. B. WOOLLATT,

Principal Veterinary Surgeon.

Pietermaritzburg,

30th August, 1906.

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## **Devon and Ayrshire Cattle.**

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With reference to the recent importation by the Government of bulls of various breeds, a few particulars with regard to Devon and Ayrshire cattle may prove of interest.

### **DEVON CATTLE.**

The general form of a Devon, writes Lieut.-Colonel J. T. Davy, late Editor of the "Devon Herd Book," is very graceful, and exhibits a refined organisation of animal

qualities unsurpassed by any other breed. The expression of the face is gentle and intelligent; the head small, with a broad, indented forehead, tapering considerably towards the nostrils; the nose of a creamy white; the eye bright and prominent, encircled by an orange coloured ring; the jaws clean, and free from flesh; the ears thin. The horns of the female are long and spreading, gracefully turned upwards, and tapering off towards the ends. The general aspects of the head should in many points resemble that of the deer. The horns of the bull are thicker set and more highly curved, in some instances standing out nearly square, with only a slight inclination upwards.

Red is the true Devon colour, which varies from a dark to a lighter, or almost to a chestnut shade. In summer the skin is mottled with beautiful spots of a slightly darker shade than the ground colour of the skin.

The outline of a fat Devon very nearly approaches a parallelogram. The frame is level from the tops of the shoulders to the tail; the belly is longitudinally straight, and well filled out at the flanks. The breast is wide, coming out prominently between the forelegs, and extending downwards almost to the knee joints. The neck is long and thin, increasing towards the shoulder, which is tapered off to meet it. The ribs project at right angles to the back, with wide flat loins, and long rumps well filled out, thus enabling them to be loaded with more beef in the most valuable parts than almost any other breed.

As converters of vegetable into animal food, breed against breed, they return as much per acre, for weight of food consumed, as any. Animals possess no magical power of producing beef, except from the food which they consume; it is, therefore, contended that, if the herbage of any given number of acres were to be consumed by Devons, they would produce in the aggregate as much beef as any other breed, a greater number being required to consume it; at the same time there would be a greater weight of the most valuable beef, and less of the coarse joints and offal. On a poor pasture, from their peculiar build, they are enabled to travel rapidly over the ground without fatigue, and get sufficient nourishment where a heavy Shorthorn or Hereford would starve.

Devons are not a milking breed, but the milk is rich, and as much can be made from the Devon as from any other mixed breed or Shorthorn, and they are more hardy. These animals which will thrive in cold, bleak, hilly districts cannot fail to flourish in more favoured situations.

It is hardly doing justice to the Devon to conclude a notice, however short, without referring to their superior qualities for draught purposes. Without disparaging other breeds, we are bound to state that the Devon is quite unrivalled as a worker, and this is due to his activity and strength. We have not a ponderous overweighted animal, good at a dead pull, no doubt, but hardly able to crawl under its own weight, but we have a class of cattle that, with proper training, are capable of walking as fast and getting through as much work as heavy draft horses. Another point that may be urged in favour of this breed is that, though careful breeding and selection have only been practised of late years, they have always been noted for symmetry and quality.

### AYRSHIRE CATTLE.

The following, from a report of the Ayrshire Agricultural Association, gives the "points" which indicate superior quality in the Ayrshire dairy cows:—

"Head short, forehead wide, nose fine between the muzzle and the eyes, muzzle moderately large, eyes full and lively, horns widely set on, inclining upwards, and curving slightly inwards.

"Neck long and straight from the head to the top of the shoulders; free from loose skin on the under side, fine at its junction with the head, and the muscles symmetrically enlarging towards the shoulders.

"Shoulders thin at the top, brisket light, the whole forequarters thin in front, and gradually increasing in depth and width backwards.

"Back short and straight, spine well defined, especially at the shoulder, the short ribs arched, the body deep in the flanks, and the milk veins well developed.

"Pelvis long, broad and straight, hook-bones (ilia) wide apart, and not much overlaid with fat, thighs deep and broad, tail long and slender, and set on level with the back.



"Milk vessels capacious and extending well forward, hind part broad and attached firmly to the body, the sole or under surface nearly level, the teats from 2 to 2½ inches in length, equal in thickness, and hanging perpendicularly; their distance apart at the sides should be equal to about one-third of the length of the vessel, and across to about one-half of the breadth.

"Legs short, the bones fine and the joints firm.

"Skin soft and elastic, and covered with soft, close woolly hair.

"The colours preferred are brown, or brown and white, the colours being distinctly defined."

An Ayrshire farmer, Mr. P. McConnell, writing in the "Live Stock Journal Almanac," thus records his experience of Ayrshire cows:—

"Her hardiness will enable her to live and to thrive in exposed situations and on scanty fare; while, when taken south, if she gets plenty of good water to drink, and is not pampered with too much good food she will do better and will repay the outlay and trouble."

In his book, "The Farm and the Dairy," Professor Sheldon remarks that as milk producers the Ayrshires are very superior, though their milk is not specially rich like that of the Jerseys and Guernseys. "Some Ayrshire cows," he adds, "have yielded as much as a thousand to twelve hundred gallons of milk in a year, and this yield, considered in relation to the size of the animal, is quite wonderful. Their milk appears to be specially adapted for cheese-making purposes, being rich in casein; but I once had an Ayrshire cow who yielded for a time two pounds of butter per day, besides milk and cream used in the house. Amongst the hardiest and most active cows, they will thrive where many other breeds would almost starve, and yet they are found to respond as well as any to generous treatment, though as beef-makers they rank but little higher than the Jerseys."

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## Profitable Poultry.

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Much has been written, and is still being written on the subject of poultry keeping. It is a subject which never seems to grow dull, or to lack partisans who can discuss it with equal fervour and unfailing enthusiasm.

Few people have ever succeeded in making more than a bare living out of fowls, and yet few are those who have not succumbed to the fascination of keeping some one or other of the many beautiful breeds now known. In Rhodesia, where the supply of eggs is so uncertain and prices so high, poultry keeping would seem to offer a by no means unprofitable addition to the usual productions of the farm, and particularly on the fruit and vegetable farm.

While mentioning poultry on farms, it would be well to mention one or two of the useful poultry foods which are so often ready to hand on a farm, and yet so rarely utilised. Milk, sour or sweet, is an excellent diet for poultry, especially for chicks. Beans ground to a meal, and boiled till of the consistency of thick soup, produce a nitrogenous food of high value, containing many of the ingredients of an egg. Wheat, turnips, beetroot, tomatoes, and lucerne are all splendid food for fowls. With due precaution against overcrowding, large flocks of poultry might most economically be kept, with most profitable results. This would gradually regulate the egg market, with the beneficial consequence of cheap eggs at all seasons of the year. Moreover, it might be arranged that some agent in the towns took delivery of a supply of table birds, which could either be put on the weekly market or sold by the agent himself, thus putting within reach of the town dweller decent poultry for the table, instead of the miserable little caricature of a fowl that the wily Mashona persuades us to buy at eighteen pence or two shillings.

While some breeds of poultry are better suited for the production of good table fowls than others, it is misleading to pick out any one breed as being better layers than others; particular excellence of laying capacity is not due to the birds being of any one breed, but to the special strain from which they are sprung. To ascertain and breed from this strain is the art of poultry rearing. For anyone starting poultry and wishing to know which breed to get, I would recommend the White Wyandottes.

These birds have several points in their favour. Firstly, the colour is very suitable for this country, then they are very hardy and good foragers; they also make good table birds, and if procured from a reliable source, where a study of this breed has been made, for utility and not for exhibition purposes, there are few if any other breeds to equal them as layers.

America is the home of the Wyandottes—one might almost say they were invented there, at any rate it was American ingenuity and perseverance that evolved this most useful and profitable breed.

Anyone anxious to improve their flock of poultry could not do better than buy a cockerel of this breed, one of a strain of well-known layers, and at the same time provide themselves with a number of trap nests. These nests are simply made, the idea being to provide that the hen on entering the nest closes a door or flap behind her. The person in charge of the poultry thereby being able to record exactly the number of eggs laid by each individual hen. By this means the poor and non-layers can be culled out, reducing the cost of keeping the flock, and increasing the profits.

It will probably come as a surprise to many people adopting this method how very much different birds vary in their capacity for laying. Some few pullets never lay at all, others are very poor producers, and many only total about 80 eggs in the year, yet by the use of trap nests and careful selection, birds can be bred up to lay 150 eggs and over per annum. This process of selection naturally takes time, and the flock can be much more quickly improved by buying a pen of birds, say a cock and five or six pullets, and breeding only from this pen. If these birds are from a guaranteed laying strain, and take after the parent stock, none of whom should have a record of less than 180 eggs per annum, there will be ample eggs for hatching from these birds alone, and in about ten months to a year, a large number of pullets should be coming on to lay, many of whom will be equal to or surpassing the original stock in laying capacity, not to mention a number of young cockerels fit for killing. When this flock is once established do not discontinue to use the trap nests, for you will want to select the very best pullets for next breeding season, and continue to improve the strain till you have birds which will win in any laying competition.



All this involves a considerable amount of trouble, and some book work for keeping a record of the produce of each hen, but the results justify this, as can easily be seen, when you can produce a bird that will do the work of three of the sort that you have been accustomed to keep.

In one year (1904) £2,613 went out of the country for imported eggs alone. With a reasonable amount of care and selection, as indicated in this article, this amount could soon be wiped off the list of our imports. The following are the principal points of the Wyandotte.

*Head.*—General appearance resembling that of the Brahma of the fine headed type, short and broad, beak nicely curved, comb rose, but narrow and low, surface even, and uniformly studded with small points, spike behind much less than Hamburgs, and rather curving down behind to match curve of the head itself. Wattles medium, ear-lobes well developed, neck rather short, with a good sweep, and full flow of hackle on to the shoulders.

*Body.*—General appearance short and broad, a plump shape, shoulder and saddle both broad, and short, concave sweep to the tail. Breast full and round, more than most varieties, whole body deep through, wings medium, and deeply folded.

*Tail.*—Medium, well spread and carried well up, but flowing and in no degree squirrel-fashion.

*Legs and Feet.*—Thighs short, fairly furnished with fluff. Shanks rather short, and pretty stout, toes well spread.

*Carriage.*—Very graceful, looking well balanced. Average weight, eight and a half pounds adult, seven and a half pounds young.

Carriage of hen very neat and matronly.

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## South African Products Exhibition, London, 1907.

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All arrangements in connection with this Exhibition are being steadily pushed forward under the able direction of Captain P. C. van B. Bam, M.L.A., Chairman of the London Executive Committee, and the other members of the London Committee, who are as follows:—Sir

Thomas Fuller, for the Cape Colony; Sir Lewis Michell, for Rhodesia; Sir William Arbuckle, for Natal; the Hon. J. W. Palmer, Director of Agriculture, for the Orange River Colony; and Mr. Wedgwood, M.P., for the Transvaal.

The following facilities have been granted by the Central South African Railways, Cape Government Railways, and Rhodesian Railways, for the conveyance of exhibits and exhibitors to the Exhibition:—

Excursion tickets will be issued at the rate of the single fare, plus 10 per cent., for the return journey. Also free conveyance of the exhibit, provided that, at the time, either the exhibitor wishes to travel himself, or to forward his exhibit, a certificate is handed in, signed by the Director of Agriculture of the Colony in which he lives, or from which he forwards his exhibit.

In the event of a sufficient number of people going over from the Colonies, Captain Bam is prepared to make arrangements that during their stay in England, facilities may be given them to visit some of the farms and colleges in England, Ireland, and Scotland, and perhaps on the Continent. Negotiations have already been opened with Messrs. Thos. Cook and Sons, who are prepared to tell intending visitors what such a trip would cost them, but the final arrangements depend on the number of people going over, therefore exhibitors at the Exhibition, who are anxious to avail themselves of these facilities, should communicate with the Agricultural Department as soon as possible. Probably any facilities offered to farmers and others interested in the Exhibition would, in most cases, include the families of such people. It is the desire of the Executive Committee to get as many South Africans as possible to be present at the Exhibition, and they intend to give every preference to South Africans who are in England at the time.

It is proposed to have judges to judge all exhibits, and it is hoped that prizes will be given, and if this is not possible, a certificate of merit to the best exhibits. For the real success of the Exhibition the promoters are anxious to have for sale such articles as South African tobacco, cigars, and cigarettes, in small quantities, and got up in an attractive way; also all kinds of fruit, honey, or native curios, so that the public may be able to carry away

with them some genuine South African product or curio, as a memento of their visit to the Exhibition. These several articles should be sold as cheaply as possible, and their wide distribution in this manner would be an excellent means of advertising. One very important point, especially to Rhodesia, one of whose principal exhibits will be tobacco in its various forms, is the following:—

If dutiable exhibits are to be sold or given away, the party sending them to be given away, or the exhibitor who is going to sell them, will have to pay the duty himself. The London Executive of the Exhibition will have to enter into a bond with the Customs authorities for any exhibit of tobacco or other dutiable article which is being sent over, stating that they are only for exhibition purposes, and if they are given away or sold the duty will have to be paid by the sender. Otherwise the Executive will be saddled with a tremendous amount of duty.

All non-perishable articles must arrive in England at the latest by the boat arriving on February 2nd, and all perishables by the boat arriving on February 9th. In the case of the former they should be sent a fortnight or three weeks beforehand, and all perishables will have to be replenished weekly, up to April 15th, arriving in England on the Saturday of each week.

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## **Importation of Livestock through the Bechuanaland Protectorate.**

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Information has been received from the Bechuanaland Protectorate Government that the restrictions with regard to the transit by rail of equines, cattle, sheep, goats, and dogs, through the Protectorate to Rhodesia, have been removed, and it is no longer necessary to obtain a permit from the Protectorate authorities for such animals to pass through their territory.

Game horns and skins, and sheep and goat skins, may also pass through the Protectorate from Rhodesia without permits.



## Locust Destruction.

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With reference to the article on the above subject which appeared in the last issue of the Journal, and which has been widely distributed in bulletin form, materials for destroying young locusts by spraying have been distributed for the use of farmers and others who will undertake to combat the pest. Spray pumps and materials for spraying are issued free of charge on the understanding that directions for their use will be strictly followed, and reports of results notified to the Agricultural Department, at Salisbury, or Civil Commissioners or Magistrates of districts.

As the supply of spray pumps is limited, persons to whom they are issued are requested to return them as soon as done with, so that they may be available for further issue. Supplies have been forwarded to the following for distribution in the respective districts:—

### MASHONALAND.

Civil Commissioner, Umtali.  
 The Manager, Rhodes Estates, Inyanga.  
 Native Commissioner, Rusapi.  
 Trappist Mission, Macheke.  
 C. S. Heron, Esq., Eagle's Nest, Makoni, Headlands.  
 J. H. Finch, Esq., Marandellas Station.  
 Cattle Inspector, Victoria.  
 Native Commissioner, Enkeldoorn, Charter.  
 Cattle Inspector, Melsetter.

### MATABELELAND.

Civil Commissioner, Bulawayo.  
 Civil Commissioner, Gwelo.  
 Native Commissioner, Bulilima.  
 Native Commissioner, Bembesi.  
 Native Commissioner, Wankie.  
 Native Commissioner, Shiloh, Bubi.  
 W. L. Hodges, Esq., Lynwood, Blinkwater.  
 C. M. Parry, Esq., Nyamandhlovu.  
 Native Commissioner, Insiza.

Applications for further supplies of spray pumps, arsenite of soda and sugar, should be addressed to the Agricultural Department, Salisbury, or the Civil Commissioner, Bulawayo, when they will be met as far as possible.

A limited number of locust traps are also available for use in localities where spraying is impracticable owing to scarcity of water. Applications for these should be addressed to the Agricultural Department, Salisbury, or the Civil Commissioner, Bulawayo. Full directions for the use of these traps will be found in the bulletin above referred to.

It is essential to the success of the scheme that farmers and district officials should co-operate and make every effort to destroy all swarms before they reach the flying stage. All persons interested in agriculture are earnestly requested to send reports of locusts—hoppers or flyers—to the Agricultural Department on the post-cards issued for the purpose.

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## Correspondence.

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TO THE EDITOR, "AGRICULTURAL JOURNAL."

SIR,—

Would you kindly inform me the feeding value of Stover (or Shredded Mealie Stalk) compared with the following hays and grasses underneath mentioned:—

Natal Blue Grass.

Ordinary Veldt Grass (or Hay).

Sweet Grass Hay.

Timothy Hay.

Oat Hay (or Forage).

Lucerne Hay.

By so doing you would greatly oblige,

Yours faithfully,

J. STEWART.

[The following analysis is given by McConnell in his Agricultural Note Book. No analysis of Natal Blue grass hay, or ordinary veldt hay, has so far been published:—

|                     | Digestible Matter. |       |                |
|---------------------|--------------------|-------|----------------|
|                     | Albuminoids.       | Fats. | Carbohydrates. |
| Stover ... ..       | 1·1                | 0·3   | 37·0           |
| Sweet Grass Hay ... | 7·4                | 1·3   | 41·7           |
| Timothy Hay ... ..  | 5·8                | 1·4   | 43·4           |
| Oat Hay ... ..      | 7·2                | 1·1   | 35·9           |
| Lucerne Hay ... ..  | 12·3               | 0·9   | 31·4           |

Albuminoids.—Nitrogenous material that goes to form the flesh of animals.

Fats.—At first digested and taken into the blood, and then burnt in respiration to give heat and mechanical force.

Carbohydrates.—Immediately used for heat and mechanical work; if taken in excess are stored up as fat.—ED.]

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TO THE EDITOR, "AGRICULTURAL JOURNAL."

SIR,—

Will you please tell me what is the earliest date that a dog may go mad after contact with a mad dog? Also how long after such contact a dog may be considered not to have been bitten and to be safe? Is it safe to let a suspect continue to suckle her pups?

Yours, etc.,

M.

P.S.—I mean a bitch suspected of having been in contact with a mad dog, not of showing symptoms of rabies.

[No definite information can be given on these points. Refer to article on Rabies in the April number of the Journal, and also to the monthly reports by the Chief Veterinary Surgeon.—ED.]



## Epitome of Cattle Inspectors' Returns.

SEPTEMBER.

SALISBURY.

*African Coast Fever.*

Fresh Outbreaks: None.

Existing Outbreaks: No deaths.

*Epizootic Lymphangitis.*

Fresh Outbreaks: An outbreak occurred amongst mules at the Jumbo Mine, Masoe. One diseased animal destroyed, and three suspects removed to the Isolation Camp, Salisbury. Twenty-seven healthy in-contacts removed to owner's farm near Salisbury. These have since been returned to work.

Existing Outbreaks: No fresh cases.

*Rabies.*

One suspected case occurred in the district, and two dogs from the Epworth Mission were destroyed as having been in contact with a suspected rabid dog.

*Mange.*

An outbreak occurred amongst a lot of donkeys recently imported from the Transvaal. All the animals were quarantined until diseased ones recovered.

*Vegetable Poisoning.*

A large number of cases have been reported.

BULAWAYO.

*African Coast Fever.*

Fresh Outbreaks: None.

Existing Outbreaks: The cattle removed from the infected area at Esingwani during July remain healthy.

*Epizootic Lymphangitis.*

Fresh Outbreaks: None.

Existing Outbreaks: Two cases occurred amongst the mules quarantined last month. The affected animals were destroyed.

*Glanders.*

The following animals were tested with Mallein on importation and found healthy:—Horses, 22; Mules, 52; Donkeys, 93.

The horse referred to last month as having re-acted to Mallein, gave a severe re-action to the second test, and was destroyed.

*Rabies.*

Four cases occurred in the township of Bulawayo.

*Scab.*

Existing Outbreaks: Two flocks remain under licence.

UMTALI.

*African Coast Fever.*

Fresh Outbreaks: None.

Existing Outbreaks: No deaths.

*Pyæmia.*

Fresh Outbreaks: None.

Existing Outbreaks: One horse remains in quarantine.

*Rabies.*

No fresh cases.

*Scab*

Fresh Outbreaks: Two.

Existing Outbreaks: One flock released, making ten now in quarantine.

GWELO.

*African Coast Fever.*

Fresh Outbreaks: None.

Existing Outbreaks: No deaths.

*Scab.*

Fresh Outbreaks: Three.

VICTORIA.

*African Coast Fever.*

Fresh Outbreaks: None.

Existing Outbreaks: Nineteen deaths at No. 1 Concentration Camp.

*Rabies.*

A Kafir dog suspected of being affected unfortunately escaped. A cat and several dogs bitten by him were destroyed.

The death of a mule with symptoms suspicious of rabies is reported.

ENKELDOORN.

The only disease is a suspected case of rabies in the Township.

MELSETTER.

*African Coast Fever.*

Fresh Outbreaks: A suspected case was reported from J. Moolman's farm "Avontuur." There is very little reason to suspect Coast Fever. The affected animal, a calf, died after a few hours illness. No case of disease has occurred on the farm since February, 1905.

Existing Outbreaks: No deaths.

*Scab.*

Two flocks released, leaving five under licence.

BELINGWE.

No fresh outbreaks contagious disease.

*Scab.*

Several native flocks remain under licence.



MANGWE.

*Scab.*

One fresh outbreak.

GENERAL.

*African Coast Fever.*

Total deaths during month, 19; total deaths during corresponding month last year, 105.

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OCTOBER.

SALISBURY.

*African Coast Fever.*

Fresh Outbreaks: None.

Existing Outbreaks: No deaths.

*Epizootic Lymphangitis.*

Fresh Outbreaks: One case was discovered in a stable in town. The affected animal, a mule, was at once destroyed.

Existing Outbreaks: Six infected animals remain in quarantine at the Isolation Camp.

*Rabies.*

Two rabid dogs destroyed in Salisbury. Three suspicious cases reported from the farm "Meadows."

*Mange.*

A mule affected with this disease was placed in quarantine.

*Fluke.*

A serious outbreak of this disease was reported from the farm "The Crag."

*Redwater.*

Seven Government bulls, imported from non-infected Redwater areas in Cape Colony, were inoculated with blood taken from a calf running on a farm about ten miles from Salisbury. Typical re-actions occurred, and the piroplasma bigeminum was demonstrated in the blood.

## BULAWAYO.

*African Coast Fever.*

Fresh Outbreaks: None.

Existing Outbreaks: No deaths.

*Epizootic Lymphangitis.*

Fresh Outbreaks: None.

Existing Outbreaks: Three suspicious cases remain under observation.

*Rabies.*

Three rabid dogs were destroyed in the Township.

*Glanders.*

The following animals were tested with Mallein on importation and found healthy:—Horses, 4; Mules, 26; Donkeys, 48.

## UMTALI.

*African Coast Fever.*

Fresh Outbreaks: None.

Existing Outbreaks: No deaths.

*Pyæmia.*

One horse remains in quarantine.

*Rabies.*

A suspected rabid dog was destroyed at Penhalonga.

*Scab.*

Fresh Outbreaks: One.

Existing Outbreaks: One flock released. Ten now under licence.

*Mange.*

One donkey in quarantine.

GWELO.

*African Coast Fever.*

Fresh Outbreaks: None.

Existing Outbreaks: No deaths.

*Scab.*

Existing Outbreaks: Three flocks released.

VICTORIA.

*African Coast Fever*

Fresh Outbreaks: None.

Existing Outbreaks: Twenty-eight deaths at No. 1 Concentration Camp. The work of removing the cattle from this area to clean veldt is now proceeding.

ENKELDOORN.

Three head of cattle died on Mr. Souter's farm in the Chilimanzi District, cause of death said to be gall-sickness. Coast Fever has never existed on this farm, or in the vicinity, and there is no reason for suspecting its existence now.

*Horse Sickness.*

Three mules and one horse contracted this disease, one mule and the horse died.

MELSETTER.

*African Coast Fever.*

Fresh Outbreaks: None.

Existing Outbreaks: No deaths.



## BELINGWE.

*Scab.*

Several native flocks under licence.

## MANGWE.

No contagious disease.

## GENERAL.

*African Coast Fever.*

Total deaths during month, 28; total deaths during corresponding month last year, 13.

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**Market Report.**


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|                          | Salisbury.   | Bulawayo.    | Kimberley.   | Johannesburg. |
|--------------------------|--------------|--------------|--------------|---------------|
| Barley, per 163 lbs. ... | 30/- to 32/6 | ...          | 9/6 to 13/6  | 7/- to 12/-   |
| Beans, per 203 lbs. ...  | 16/- to 17/6 | ...          | 42/6 to 45/- | 16/- to 40/-  |
| Forage, per 100 lbs. ... | 8/- to 11/-  | ...          | 6/- to 6/3   | 6/3 to 7/3    |
| Mealie Meal ...          | 18/6 to 19/- | ...          | 23/6 to 24/6 | 22/- to 26/-  |
| Mealies (Yellow) ...     | 16/- to 16/6 | 19/- to 20/- | 15/6 to 16/- | 14/3 to 14/9  |
| " (White) ...            | 16/6 to 16/9 | 21/- to 22/- | 15/6 to 16/- | 14/3 to 14/9  |
| Kaffir Corn ...          | 12/- to 13/6 | 12/6 to 17/6 | 15/6 to 16/6 | 13/6 to 15/-  |
| Inyouti ...              | 14/- to 15/- | 16/- to 16/6 | ...          | ...           |
| Oats, per 150 lbs. ....  | 29/- to 30/- | ...          | 13/9 to 14/- | 15/6 to 15/9  |
| Oat Hay ...              | 9/- to 10/6  | 10/- to 12/- | ...          | ...           |
| Hay, per ton ...         | 35/-         | 40/- to 60/- | ...          | ...           |
| Wheat, per 203 lbs. ...  | 25/- to 27/6 | ...          | 21/6 to 22/- | 21/- to 21/9  |
| Potatoes :—              | per lb.      | per 150 lb.  | 163 lbs.     | 163 lbs.      |
| Colonial ...             | 2¾d. to 3d.  | 23/- to 25/- | 6/- to 10/-  | 8/- to 13/6   |
| New ...                  | 3½d. to 4d.  | ...          | 5/- to 14/-  | ...           |
| Flour, per 100 lbs. ...  | 20/- to 24/- | ...          | 14/- to 14/6 | 14/6 to 16/-  |
| Butter ...               | 2/-          | ...          | 1/5 to 1/9   | 6d. to 1/-    |
| Eggs, per dozen ...      | 2/- to 3/6   | ...          | 1/- to 1/3   | 11d. to 1/3   |
| Oxen—Slaughter (100 lb.) | 40/-         | 40/- to 42/- | 40/- to 46/- | 47/- to 50/-  |
| Small Stock, per head .. | 30/-         | 23/-         | 18/- to 20/- | ...           |
| Pigs, per lb. ...        | 4d. to 4½d.  | ...          | 3¾d. to 4d.  | 3½d. to 4d.   |

Fruit Netting, for protecting fruit trees and vines from birds and insect pests, can now be obtained from the Agricultural Department, Salisbury. This netting is 72 inches wide, and packed in bales containing 48 yards. Any length can be supplied at 3½d. per yard, on receipt of remittance covering cost and transport charges.

## Rainfall.

The following rainfall statistics, compiled by Mr. S. F. Townsend, of the Rhodesian Railways, Ltd., Bulawayo, are of great interest.

Mr. S. F. Townsend says that the records kept at Hope Fountain more or less accurately represent the rainfall for the past 18 years; fortunately the blanks in the record mostly occur in the dry season, and therefore do not materially affect the mean rainfall.

The longest period of dry weather was from the first week in March, 1905, to the 17th December, 1905, during which period it hardly rained at all. This season has started with two records:—

|                  |      |
|------------------|------|
| September ... .. | 1·42 |
| October ... ..   | 4·18 |

and the weather looks very promising for more rain.

### BULAWAYO RAINFALL.—1905-1906.

|                  | Hope<br>Fountain. | Bulawayo<br>Railway<br>Station. | Suburbs<br>S.F.T. | Suburbs<br>R.C.<br>Observatory. | Hillside. |
|------------------|-------------------|---------------------------------|-------------------|---------------------------------|-----------|
| 1905.            |                   |                                 |                   |                                 |           |
| July ... ..      | 0·19              | 0·06                            | 0·10              | 0·05                            | ...       |
| August ... ..    | ...               | ...                             | ...               | ...                             | ...       |
| September ... .. | ...               | 0·06                            | 0·03              | 0·01                            | 0·105     |
| October ... ..   | 0·04              | 0·06                            | 0·07              | 0·12                            | 0·06      |
| November ... ..  | 0·76              | 0·53                            | 0·53              | 0·36                            | 0·50      |
| December ... ..  | 2·46              | 3·05                            | 2·82              | 2·28                            | 3·445     |
| 1906.            |                   |                                 |                   |                                 |           |
| January ... ..   | 9·02              | 10·43                           | 8·90              | 10·11                           | 8·82      |
| February ... ..  | 9·48              | 6·45                            | 6·24              | 5·16                            | 8·01      |
| March ... ..     | 2·14              | 2·57                            | 3·47              | 3·13                            | 4·12      |
| April ... ..     | 0·10              | 0·04                            | 0·07              | 0·07                            | 0·02      |
| May ... ..       | 0·19              | 0·04                            | 0·06              | 0·05                            | 0·07      |
| June ... ..      | 0·01              | 0·08                            | 0·06              | 0·05                            | 0·06      |
| Totals ... ..    | 24·39             | 23·37                           | 22·35             | 21·39                           | 25·21     |

## NOTES ON RAINFALL AT HOPE FOUNTAIN, MATABELELAND.

|           | 1888  | 1889  | 1890  | 1891  | 1892  | 1893  | 1894  | 1895  | 1896  | 1897  | 1898  | 1899  | 1900  | 1901  | 1902  | 1903  | 1904  | 1905  | 1906   | Means. |
|-----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|
| July      | ...   | 0'43  | ...   | ...   | 0'01  | 0'22  | ...   | ...   | ...   | ...   | ...   | ...   | ...   | ...   | ...   | ...   | ...   | ...   | 0'19   | 0'047  |
| August    | ...   | 0'07  | ...   | 0'05  | ...   | 0'34  | 0'20  | ...   | ...   | ...   | ...   | ...   | ...   | 0'58  | ...   | ...   | ...   | ...   | ...    | 0'069  |
| September | ...   | 0'04  | ...   | 0'03  | ...   | 0'15  | ...   | ...   | 1'05  | ...   | 0'69  | ...   | ...   | 0'37  | 0'33  | ...   | ...   | ...   | ...    | 0'154  |
| October   | ...   | 0'12  | 1'90  | 0'94  | 1'60  | 0'88  | 0'92  | 0'20  | 0'88* | ...   | 0'41  | 0'45  | 0'02  | 1'34  | 2'09  | 2'42  | 1'54  | 0'04  | ...    | 0'885  |
| November  | ...   | 3'38  | 9'78  | 3'51  | 2'05  | 3'86* | 1'04  | 4'74  | 1'85  | 4'99  | 3'29  | 2'67  | 5'46  | 5'07  | 7'07  | 3'95  | 3'52  | 0'76  | ...    | 3'864  |
| December  | ...   | 0'67  | 7'77  | 1'63  | 1'66  | 4'63* | 2'86  | 10'61 | 4'72  | 7'82  | 5'05  | 4'80  | 6'71  | 8'50  | 0'36  | 2'88  | 4'02  | 2'46  | ...    | 4'627  |
| January   | ...   | 11'44 | 9'23  | 13'10 | 11'34 | 7'29  | 5'63  | 3'46  | 8'74  | 7'75  | 4'44  | 11'54 | 4'37  | 8'18  | 8'86  | 8'47  | 2'56  | 9'02  | ...    | 8'190  |
| February  | ...   | 1'28  | 10'33 | 6'00  | 6'36  | 10'83 | 9'25  | 3'63  | 4'38  | 0'98  | 7'07  | 0'56  | 4'21  | 1'11  | 0'95  | 0'49  | 7'40  | 9'48  | ...    | 5'607  |
| March     | ...   | 0'21  | 4'43  | 0'03  | 1'02  | 1'01  | 4'01  | 3'36* | 5'52  | 4'69  | 1'79  | 4'08  | 5'55  | 3'64  | 4'97  | 5'18  | 3'35  | 2'14  | ...    | 3'359  |
| April     | ...   | ...   | 0'65  | 4'79  | 2'17  | 0'53  | 0'23  | 1'09* | ...   | 0'47  | 2'48  | 1'39  | 2'69  | 0'94  | 0'92  | 0'27  | 0'05  | 0'10  | ...    | 1'995  |
| May       | ...   | ...   | ...   | ...   | ...   | ...   | ...   | ...   | ...   | 0'31  | 0'41  | 0'28  | ...   | 0'01  | 0'96  | 0'35  | ...   | 0'19  | ...    | 0'143  |
| June      | ...   | 0'11  | ...   | ...   | ...   | ...   | ...   | ...   | 0'03  | 0'04  | 0'04  | 0'36  | ...   | ...   | ...   | ...   | ...   | 0'01  | ...    | 0'086  |
|           | 17'23 | 43'01 | 44'80 | 30'08 | 26'21 | 30'34 | 24'74 | 27'09 | 27'77 | 27'05 | 25'67 | 26'73 | 29'37 | 29'74 | 25'61 | 24'01 | 22'44 | 24'39 | 28'126 |        |

Mean Annual Rainfall, July to June, 28'126 ins.

" " Fifteen complete Seasons (omitting Seasons ending 1894, 1896 and 1897), 28'072 ins.

August, 1893 (Matabele War) estimated from Rev. C. D. Helm's Notes.

September, October, November, December (Matabele War), 1893; the figures represent the mean of those months of which record has been kept.\*

March, April and October (Matabele Rebellion), 1896; the figures represent the mean of those months of which record has been kept.\*

May, June, July and August (Matabele Rebellion), 1896: Residents here then say no rain fell in those months.

September, 1896, estimated from Valley being in flood.

July, 1906.



STATEMENT OF RAINFALL RECORDED AT VARIOUS STATIONS IN  
SOUTHERN RHODESIA DURING THE MONTHS OF SEPTEMBER  
AND OCTOBER, 1906.

COMPILED BY THE ACTING STATIST.

| NAME OF STATION.                  | SEPTEMBER. |                          |                                       | OCTOBER. |                          |                                       |
|-----------------------------------|------------|--------------------------|---------------------------------------|----------|--------------------------|---------------------------------------|
|                                   | Amount.    | No. of<br>Rainy<br>Days. | Greatest<br>Amount<br>in<br>24 hours. | Amount.  | No. of<br>Rainy<br>Days. | Greatest<br>Amount<br>in<br>24 hours. |
| <b>MASHONALAND.—</b>              |            |                          |                                       |          |                          |                                       |
| Ayrshire Mine ... ..              | 0'00       | 2                        | 0'04                                  | 6'01     | 8                        | 2'32                                  |
| Borrowdale ... ..                 | 0'14       | 2                        | 0'12                                  | 1'61     | 9                        | 0'84                                  |
| Chishawasha ... ..                | 0'41       | 2                        | 0'28                                  | 1'53     | 10                       | 0'68                                  |
| Driefontein, Blinkwater ... ..    | ...        | ...                      | ...                                   | 2'60     | 8                        | 2'03                                  |
| Enkeldoorn ... ..                 | 0'00       | 0                        | 0'00                                  | 1'90     | 7                        | 0'54                                  |
| Gutu ... ..                       | 0'02       | 1                        | 0'02                                  | 0'93     | 10                       | 0'34                                  |
| Helvetia, South Melsetter ... ..  | 1'05       | 3                        | 0'75                                  | ...      | ...                      | ...                                   |
| Hospital, Salisbury ... ..        | 0'56       | 1                        | 0'56                                  | 3'42     | 8                        | 1'52                                  |
| Inyanga (Rupurara) ... ..         | 0'01       | 1                        | 0'01                                  | ...      | ...                      | ...                                   |
| Inyanga Police Camp ... ..        | 0'22       | 1                        | 0'22                                  | 1'16     | 10                       | 0'33                                  |
| Marandellas ... ..                | ...        | ...                      | ...                                   | 3'39     | 10                       | 1'00                                  |
| Melsetter ... ..                  | 0'06       | 2                        | 0'04                                  | 2'42     | 7                        | 1'19                                  |
| Macheke ... ..                    | 0'05       | 1                        | 0'05                                  | 1'88     | 9                        | 0'61                                  |
| Mount Darwin ... ..               | 0'02       | 1                        | 0'02                                  | 1'30     | 4                        | 0'99                                  |
| M'Rewa ... ..                     | 0'02       | 1                        | 0'02                                  | 2'28     | 9                        | 0'77                                  |
| Progress Farm, Marandellas ... .. | 0'00       | 0                        | 0'00                                  | 3'84     | 7                        | 1'10                                  |
| Public Gardens, Salisbury ... ..  | 0'68       | 1                        | 0'68                                  | ...      | ...                      | ...                                   |
| Rusapi ... ..                     | 0'00       | 0                        | 0'00                                  | 4'60     | 9                        | 2'84                                  |
| Umtali ... ..                     | 0'01       | 1                        | 0'01                                  | ...      | ...                      | ...                                   |
| Utopia, Umtali ... ..             | 0'05       | 4                        | 0'02                                  | ...      | ...                      | ...                                   |
| Victoria ... ..                   | 0'00       | 0                        | 0'00                                  | 1'48     | 6                        | 0'60                                  |
| Westridge, Salisbury ... ..       | 0'61       | 1                        | 0'61                                  | 3'78     | 8                        | 1'85                                  |
| <b>MATABELELAND.</b>              |            |                          |                                       |          |                          |                                       |
| Bulawayo ... ..                   | 1'35       | 3                        | 1'00                                  | 3'63     | 10                       | 2'46                                  |
| Filabusi ... ..                   | 0'00       | 0                        | 0'00                                  | 3'43     | 7                        | 1'90                                  |
| Fort Rixon ... ..                 | 0'05       | 2                        | 0'03                                  | 1'69     | 7                        | 0'81                                  |
| Government House, Bulawayo ... .. | 1'30       | 2                        | 0'80                                  | ...      | ...                      | ...                                   |
| Gwanda ... ..                     | 0'03       | 1                        | 0'03                                  | ...      | ...                      | ...                                   |
| Hopefontain ... ..                | 1'42       | 3                        | 1'18                                  | 4'18     | 9                        | 3'15                                  |
| Inyati ... ..                     | 0'73       | 3                        | 0'53                                  | 1'70     | 5                        | 0'65                                  |
| Matopos ... ..                    | 0'25       | 3                        | 0'13                                  | 2'06     | 5                        | 1'10                                  |
| Shiloh ... ..                     | 0'76       | 2                        | 0'73                                  | 2'09     | 6                        | 0'89                                  |
| Tegwani ... ..                    | 0'24       | 2                        | 0'17                                  | 2'55     | 5                        | 1'72                                  |
| Tuli ... ..                       | 0'28       | 2                        | 0'19                                  | 2'17     | 5                        | 0'56                                  |
| Victoria Falls ... ..             | 0'70       | 4                        | 0'28                                  | 0'74     | 2                        | 0'71                                  |

All other Stations report no rain, or send no report.

SALISBURY, 13th November, 1906.

## Reviews.

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To lovers of children, Mr. Dudley Kidd's book on "Savage Childhood" should appeal most strongly. He is a keen observer, and thoroughly well acquainted with the native races of South Africa, as anyone having read his previous book, "The Essential Kaffir," will agree.

His divisions of the period of infancy and childhood are peculiar, the appearance of the first and of the second teeth marking decided epochs in the life of the children he portrays.

The charming description of the dawn of consciousness when the little bantling realises that pain is the result of touching a pot full of boiling porridge, cannot fail to appeal to all who read the book. The surprise stories take us back to our own childhood days, when Grimm and Hans Anderson were our constant companions.

His illustrations are peculiarly fascinating, and well calculated to convey a vivid impression of the peculiar charm of the delightful little people about whom he writes.

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A valuable work, entitled "Irrigation and Land Drainage," by Mr. W. Gibbons Cox,\* has just been published. It deals in a simple, straightforward, thorough manner with this important subject. Mr. Cox writes exhaustively on the artesian areas in Australia, describing the locality, soil, and underlying strata, where bores may be sunk with good prospects of getting a strong flow of water. He describes the machinery used in sinking bores, strongly advocating simplicity in the working parts. On pages 122-3 is explained, with the help of an illustration, a spring pole plant which can be made out of timber cut on the farm, and with the use of ordinary

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\*"Irrigation and Land Drainage," by W. Gibbons Cox, C.E.

Agents: T. Maskew Miller, 120, Adderley Street, Cape Town.

Price, 6/6 post free.

boring tools, can sink to a depth of at least 200 feet. Dam building and reservoir making are also both described.

The author then proceeds to deal with the water obtained from artesian wells, or river dams, for irrigation, describing the preparation of the land, the building of the ditches and flumes, and the use of canvas dams, and boxes for the distribution of the water, to prevent the necessity of breaking and remaking the ridges. He shows, by the help of diagrams, the most suitable manner of irrigating gardens, orchards, forage, lucerne and other crops on flat and rolling lands. He also gives a plan for laying out an irrigated farm. There is, besides, a chapter on sub-irrigation.

Mr. Cox next deals with the treatment of alkaline waters, and how best to neutralise their effect on plant life by drainage and cultivation.

The chapter on "Salt Bush" is particularly interesting, showing "that artesian water, when even of an exceptionally alkaline character, may be made to produce most valuable vegetation."

The necessity of efficient drainage, and the best means of effecting same in connection with irrigation, is fully described.

In an appendix, Mr. Cox explains the use of mechanical power derivable from artesian bores. "By its use the entire force, or pressure, from artesian flows can be made available for all industrial purposes, with a greater reduced cost, wider range of application, and fuller adaptation to varying requirements than has before been realised."

This book should prove of great value to all intending to use, or already using irrigation. It is written for the non-scientific man, and should be thoroughly digested by anyone about to start irrigating work.

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## Government Notices.

No. 163 of 1906.

### RABIES.

**U**NDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby declare and make known that all and singular the Government Notices regarding the disease of Rabies now subsisting and in force in this Territory are hereby cancelled and repealed, and in lieu thereof the following shall have full force and effect :—

1. All and several the various Native Districts of Southern Rhodesia are hereby declared to be areas infected with the disease of Rabies.

2. Any Magistrate, Police Officer, Native Commissioner, Government Veterinary Surgeon or other official vested with the performance of functions under the "Animals Diseases Consolidation Ordinance, 1904," may, on it appearing to him that any dog or other animal is showing symptoms which justify investigation as to whether such dog or animal is suffering from rabies or not, order the proper detention, isolation and control of such dog or animal either in the hands of the owner or at some other suitable place.

3. Should any dog show symptoms which lead to the suspicion that such dog may be suffering from rabies, the owner thereof shall forthwith notify the fact to the nearest official vested with powers under these regulations, and shall either destroy the said dog or isolate and secure it for further observation.

4. On its appearing that any animal is actually suffering from rabies, any of the above mentioned officials may order the destruction of such animal, or may himself destroy it and may further take control of or destroy, if deemed necessary, any animal which has been in contact with a rabid animal or an animal suspected of being rabid.

5. The carcases of all animals destroyed on account of their being infected with rabies shall be thoroughly burnt by the person or official destroying them, save that such parts as may be required for scientific investigation may be retained under proper precautions. In any case in which a human being has been bitten by a rabid animal, the head of such animal shall, if possible, be taken and sent to the nearest Veterinary Official.

6. On and after the first day of October and before the 30th day of November, 1906, the owner of every dog over three months old shall register the same with an official appointed for the purpose, provided that this provision shall not apply to any Municipality, Township or similar area in which provision for registration exists and is duly enforced.

7. The Native Commissioner of any district may, on and after that first mentioned date, determine how many dogs shall be allowed at each native kraal, and the headman of each kraal shall obtain the registration of so many dogs as are allowed.

8. A registration badge shall be issued for each and every dog registered, and the said badge must be attached to a proper and sufficient collar to be supplied by the owner, which must be placed and kept on each dog registered.

9. A fee to cover the cost of registration and supply of the badge in the amount of sixpence will become demandable and payable on registration of each dog.

10. Any dog found at large after the 30th day of November, 1906, not having and bearing a duly issued registration badge, may be summarily destroyed by any person.

11. In any area appearing in the schedule hereunto attached or which may hereafter be added to such schedule and so long as the area is retained in the schedule, every dog shall be kept muzzled with a leather or wire muzzle of approved pattern or shall be secured by chain or in an enclosure in such a manner that it shall not have access to persons or animals nor other animals access to it.

12. Dogs in a scheduled area may be taken for exercise unmuzzled if led on a proper chain or leash or if securely coupled in pairs.

13. No dog shall be moved from one scheduled area to another scheduled area unless a permit from an official of the Veterinary Department be first had and obtained and it shall remain muzzled *en route*.

14. No dog shall be removed from a scheduled area to an area not scheduled unless the permission of an official of the Veterinary Department is first had and obtained; on permission being given, such dog shall be kept muzzled, except as hereinafter provided, and shall be returned to the area from which it was taken within seven days from the date of such removal, and upon return shall be submitted to a constable or official of the Veterinary Department for inspection.

15. Any dog required to be muzzled may, for the purposes of sport or for hunting wild carnivora, be allowed to be unmuzzled while in actual use, provided that it shall be muzzled when within one hundred yards of any homestead or upon the town lands of any town.

16. If a dog which should be muzzled be found wandering at large without a muzzle but either bearing a registration badge or, if without one, appearing to be of some value, such dog may be taken charge of and conveyed to the nearest police station or post and shall be there detained for at least 48 hours. If claimed by the owner or some person on his behalf within that period and appearing free from rabies, it shall be released and handed over on payment of a maintenance fee of one shilling for each day or portion of a day's detention, and failing its being claimed may be sold, destroyed or otherwise dealt with. The payment of the said fee shall not relieve the owner from any penalties he may have incurred under these regulations.

17. Any person contravening any of the above regulations or failing to carry out any of the provisions thereof shall be liable on conviction to a fine not exceeding £5 for each offence or in default of payment to imprisonment with or without hard labour for a period not exceeding one month.

#### SCHEDULED AREAS.

1. Within a radius of 15 miles of the Township of Salisbury.
2. So much of the area outside Area No. 1 as is included within a radius of 15 miles of the Police Camp, Goromondzi, Salisbury District.
3. The whole of the Seki Native Reserve, Salisbury District.
4. Within a radius of 20 miles of the Umtali Township.
5. The whole of the Native Districts of Charter, Victoria, N'danga, Chibi and Chilimanzi.
6. Within a radius of 20 miles of Nengubo Mission Station, Marandella District.
7. Within a radius of 15 miles of Fort Usher.
8. That portion of the Hartley Native District bounded on West by Eastern Boundary of Mondoro Reserve from M'budzirimi Hill to Hartley-Beatrice Road, thence on North by Hartley-Beatrice Road to Beatrice Mine, thence on East by Beatrice-Charter Road to Charter Boundary, thence on South by Charter Boundary to M'budzirimi Hill.
9. The Magisterial District of Tuli.
10. Native District of Belingwe. Government Notice 186 of 1906, July 26th.
11. Within a radius of 15 miles of the Morven Mine, situate in the Native District of Bubi. Government Notice 207 of 1906, August 16th.
12. The whole of the Native District of Mrewas. Government Notice 207 of 1906, August 16th.
13. Within a radius of 15 miles of the Market Square, Bulawayo. Government Notice 221 of 1906, September 6th.
14. Within a radius of 15 miles of Mutemerergwas Kraal, situate in the Makoni District. Government Notice 222 of 1906, September 6th.
15. Within a radius of 15 miles of the Alliance Mine, situate in the Native District of Salisbury. Government Notice 228 of 1906, September 13th.

No. 218 of 1906.

30th August, 1906.

## RABIES.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby declare and make known that the under-mentioned area has been withdrawn from the Schedule attached to Government Notice No. 163 of 1906.

## AREA.

No. 7. Within a radius of 15 miles of Fort Usher.

No. 236 of 1906.

## RABIES.

UNDER and by virtue of the "Animals Diseases Consolidation Ordinance, 1904," and with reference to Section 6 of Government Notice No. 163 of 1906, I do hereby declare and make known that all Native Commissioners and their assistants are hereby appointed Registration Officers for the purpose of registering dogs in terms of the said regulations, and that the following Police Officers are appointed Assistant Registration Officers at their respective stations for the purpose of registering dogs owned by Europeans.

| Officer in Charge | Police Station. | N.C.O. in Charge | Police Station. |
|-------------------|-----------------|------------------|-----------------|
| "                 | Gatooma         | "                | Enkeldoorn      |
| "                 | Filabusi        | "                | Blinkwater      |
| "                 | Sebakwe         | "                | Geelong         |
| "                 | Wankies         | "                | Victoria Falls. |
| N.C.O.            | Sipolilo        | "                | Figtreet        |
| "                 | Penhalonga      | "                | Ramaquaban      |
| "                 | Chipinga        | Trooper          | Essexvale       |

No. 237 of 1906.

## GAME LAW CONSOLIDATION ORDINANCE, 1906 : CLOSE SEASON, &amp;c.

UNDER and by virtue of the powers conferred upon me by the "Game Law Consolidation Ordinance, 1906," I do hereby cancel and withdraw all notices relating to game preservation and issued in terms of "The Game Preservation Ordinance, 1899," and declare the following to be of force and effect in lieu thereof :—

## CLOSE SEASON.

1. In the whole of Southern Rhodesia, the close season for game in Class "A" shall be from 1st November to 30th April in each year.
2. In the whole of Southern Rhodesia, the close season for game in Class "B" shall be from 1st December to 30th June in each year.
3. Up to 31st March, 1908, the following game shall be strictly protected and not hunted or destroyed within the respective areas mentioned :—
  - (a) Oribi, within the magisterial district of Charter.
  - (b) Grysbok, within the magisterial district of Bulawayo.
  - (c) Koorhaan, throughout Southern Rhodesia, except the magisterial districts of Charter and Victoria.
  - (d) All game within the limits of the commonages or townlands of Salisbury, Bulawayo, Umtali, Gwelo and Enkeldoorn.

4. The operation of Section 12 of the said Ordinance shall be suspended in regard to Class "A" up to 31st December, 1907, and Class "B" up to 30th June, 1907, from date hereof within the magisterial district of Melsetter.

5. That the operations of Sections 5 and 12 of the said Ordinance shall be suspended in regard to all game in Classes "B" and "C," except Ostrich, Elephant, Zebra, Hippopotamus, Rhinoceros, black and white; and all such of the Antelope species as are not contained in Classes "B" and "C" of the said Ordinance within the limits described in the schedule hereto, as to the districts of Hartley and Lo Magondi.



6. All game is strictly preserved and shall not be hunted or destroyed until further notice within the following area, which is declared a game sanctuary :—

An area in the Urungwe Sub-district of the District of Lo Magondi in the Province of Mashonaland, bounded as follows :—

On the North and West by the River Zambesi, starting at the point where the Lozenzi River joins the Zambesi and following the course of the latter river to its junction with the Sanyati River.

On the East by an imaginary line drawn from the junction of the Indurume and the Nyaodsa Rivers to the headwaters of the Lozenzi River and thence along the course of the Lozenzi River to its junction with the Zambesi River.

On the South by an imaginary line drawn due West from the point of junction of the Indurume and Nyaodsa to the Sanyati River, thence along the course of this river to where it enters the Zambesi.

#### SCHEDULE.

1. Hartley District.—Along the North side of the Railway from Umfuli Bridge to Umzwezwe Bridge, thence along the Umzwezwe River to its junction with the Umnyati, thence along the Umnyati to its junction with the Umfuli, along the Umfuli to its junction with the Umsengezi, up the Umsengezi to the Hartley-Lo Magondi footpath crossing near Madzorera Kraal, thence along the Hartley-Lo Magondi footpath to Umfuli Bridge.

2. The whole of the Lo Magondi district except within the limits declared a game sanctuary under Section 6 hereof.

No. 187 of 1906.

26th July, 1906.

#### IMPORTATION OF CATTLE.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby declare and make known that notwithstanding any general prohibition against the importation of cattle into this Territory such importation will be allowed under the following conditions :—

1. Cattle *bona fide* required for breeding purposes may be introduced from the Cape Colony provided that the permission of the Chief Inspector of Cattle is first obtained.

2. Every application for such permission shall be accompanied by a certificate in form A hereunto annexed.

3. Cattle introduced from the Cape Colony shall have not more than two permanent central incisor teeth : they shall be introduced by rail only and shall upon and after arrival at the importer's farm or at their destination be effectually isolated from all other cattle for such period as may be directed by the Chief Inspector of Cattle.

4. Cattle may be imported from North-Eastern Rhodesia provided that

(a) The permission of the Chief Inspector of Cattle be first had and obtained, which permission the said official shall have full discretion to refuse.

(b) All cattle be introduced by way of the port or town of Feira, which is hereby declared a port of entry for cattle, and taken to Sipolilos.

(c) Such cattle be submitted for inspection and passed by a duly authorised officer at Feira and at Sipolilos and such inspection be noted on the permit originally granted.

5. On and after the 1st day of November, 1906, Cattle may be imported from North-Western Rhodesia provided that,

(a) The permission of the Government Veterinary Surgeon at Bulawayo be first had and obtained, which permission the said official shall have full discretion to refuse.

(b) All Cattle imported shall be conveyed by the shortest possible route to the Railway Station at Victoria Falls, which is hereby declared a port of entry for cattle, and shall there be entrained and conveyed by rail to the centre of consumption.

(c) On arrival at their destination such cattle shall be subject to all the regulations controlling the movement and disposal of slaughter cattle.

6. Every application for permission to introduce cattle from North-Eastern and North-Western Rhodesia shall be accompanied by a certificate in the form B annexed to this notice.

7. Cattle may be imported from Great Britain or Ireland, provided

- (a) That every animal so imported is accompanied by a proper and satisfactory certificate signed by a qualified Veterinary Surgeon that such animal was submitted to and resisted the tuberculin test for tuberculosis either before being embarked or upon arrival in port, or
- (b) That if such certificate be not produced every animal so imported shall be submitted to such quarantining and testing for tuberculosis as may be directed or approved by the Chief Inspector of Cattle.
- (c) That in the event of any test ordered and made disclosing the existence of tuberculosis the animal infected shall not be removed alive from the place where quarantined, but shall be there killed, and the owner shall be allowed to deal with the carcase as he may deem fit except that he shall not without special permission from a Government Veterinary Surgeon allow the meat to be used for human consumption.
- (d) And that all of expenses of inspection, quarantine, testing, destruction or disposal shall be borne by the owner of such cattle.

8. Any person introducing cattle into Southern Rhodesia otherwise than in accordance with these regulations or submitting any certificate false in any material particular or refusing or neglecting to submit cattle introduced to proper inspections and tests, or failing to properly isolate such cattle when introduced shall be liable to a fine not exceeding £10 for every animal in connection with which the offence complained of is committed and in default of payment of any fine inflicted to imprisonment with or without hard labour for any period not exceeding three months and the cattle in regard to which the complaint has been laid and proved shall be liable to destruction without compensation.

#### ANNEXURE "A."

I certify that the animals enumerated below have been in my possession since birth, and that Lung sickness, Contagious Pleuro-Pneumonia or any other contagious or infectious disease has not existed amongst any of my cattle or on my farm within the last three years, and that such cattle in travelling to.....Station will not come in contact with any animals amongst which Lung sickness or any other infectious or contagious disease has existed during that period.

Signature.....

The above mentioned facts are to my knowledge true and correct.

Date.....

Resident Magistrate.

.....District,

Cape of Good Hope.

Number of Animals..... Bulls..... Heifers.....

Breed.....

Seller's name and address.....

Purchaser's name.....

Place in Rhodesia to which animals are being sent.....

## ANNEXURE "B."

I certify that the animals enumerated below have been in my possession for twelve months, and that no case of Lungsickness or other contagious disease has occurred amongst them or other cattle with which they have been in contact, and that in travelling to Feira (or Victoria Falls) they will not come in contact with any cattle amongst which Lungsickness or other contagious disease has existed during the last two years.

Signature.....

The above mentioned facts are to my knowledge true and correct.

Magistrate, District Commissioner, or J.P.

N.E. Rhodesia.

N.W. Rhodesia.

Date..... District.....

Number of Animals..... Bulls..... Cows.....

Heifers..... Bullocks.....

Breed.....

Seller's name.....

Purchaser's name.....

Place in Southern Rhodesia to which

animals are being sent.....

No. 188 of 1906.

26th July, 1906.

## AFRICAN COAST FEVER.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel and withdraw the regulations promulgated by Government Notices Nos. 264 of 1905 and 164 of 1906 and declare the following to be of full force and effect in lieu thereof within the Province of Matabeleland, exclusive of the District of Gwelo as described and defined by section 4 (c) of the "Southern Rhodesia Boundary Regulations Amendment Regulations, 1898," which area is hereby declared to be an area infected with a destructive disease and is hereinafter called the said area.

1. No cattle shall be moved from any other part of the Territory of Southern Rhodesia into the said area.

2. The movement of cattle to, from or across any defined area appearing in the schedule hereto or any area which may hereafter be added to that schedule so long as such area remains in and is not withdrawn from the schedule is absolutely prohibited save and except as is provided for in sections 3, 6 and 7 of these regulations.

3. The movement of all cattle within the said area is prohibited save and except

- (a) On permission granted by an Officer specially authorised thereto by the Administrator.
- (b) Within the boundaries of any single farm where such cattle are depastured.
- (c) Within an area of land enclosed by a substantial fence.
- (d) Within a radius of four miles of any native kraal situate within the boundaries of any Native Location or Reserve, and as is hereinafter further provided.



4. The movement of cattle for slaughter, *bona fide* farming, mining or breeding purposes or for private milk supplies shall be permitted under the written authority of an official thereto duly authorised subject to the following terms and conditions :

- (a) That cattle are moved to the nearest or most suitable railway station or siding, and thence by rail to their destination, or, where the district is not served by a railway by the most suitable route to their destination, all cattle travelling by road shall be under the personal supervision of a responsible white man approved of by the Cattle Inspector or of a native approved of by the Native Commissioner and the Cattle Inspector of the district within which the movement takes place.
- (b) That written permission of owners, occupiers or managers of all occupied land, and in the case of Native Reserves, of the Native Commissioner of the District over which such cattle shall pass to the nearest station, siding or destination is obtained ; provided that in the event of such owners, occupiers, managers or Native Commissioner refusing to grant such permission, the Controller of Stock may direct the issue of a permit of removal, if satisfied that the necessary permission is withheld without good and sufficient cause.
- (c) That such cattle shall before being moved, be thoroughly disinfected by dipping or by spraying to the satisfaction of the Officer issuing permit, and at the expense of the owner of such stock, and if intended for slaughter shall where possible be branded under the supervision of the Officer issuing permit with the letters "V.D." on the near side of neck.
- (d) That cattle intended for slaughter shall, on arrival at destination subject to the terms of clause (e) hereof, be immediately taken to the prescribed quarantined area and there be quarantined and confined, and where not branded in terms of clause (c) hereof, be similarly branded under the supervision of a duly authorised officer.
- (e) That all cattle intended for slaughter brought to their destination and not disinfected by dipping or spraying in terms of clause (c) hereof shall be immediately taken to the public dipping station and there be thoroughly dipped or sprayed before being taken to the quarantine area.
- (f) That all cattle admitted to the quarantine area shall be slaughtered within twenty-one days of their admission, and under no pretext whatever shall cattle so admitted be permitted to leave the said area alive ; all such cattle shall after admission to the said area be considered as likely to be infected with disease and if found wandering outside the said area or in possession of any person may be destroyed under an order of the Chief Inspector or Controller of Stock.
- (g) That on arrival at destination cattle other than slaughter cattle shall be dipped or sprayed and shall be effectually isolated from all other cattle on the same land for a period of four weeks.

5. The movement of working cattle may be permitted under the following conditions only :—

- (a) Within a radius of six miles of any working mine or mine in course of development for the purposes of such mine, provided that such cattle shall only be moved under a permit of a duly authorised officer, and shall be dipped every fourteen days or where no dipping tank is available be thoroughly sprayed with an approved dip, provided further that such permission shall not be granted when it conflicts with any other section of these regulations, or if such movement is considered dangerous to other cattle within the six mile radius.
- (b) Within the said area from private farms and trading stations to any centre of consumption or to a Railway Station or Siding within the said area under the permit of a duly authorised officer, which permit shall fully set forth the route to be traversed, provided that no such permit shall be issued until the person applying for same shall produce the written consent of the owners, occupiers or managers of

occupied lands proposed to be traversed, and, in the case of Native Reserves, of the Native Commissioner, and that such cattle shall before being moved be thoroughly disinfected by dipping or spraying at the expense of the owner and to the satisfaction of the Officer issuing the permit; provided further that in the event of such consent being unreasonably withheld, the Controller of Stock may direct the issue of a permit.

6. In the event of the failure of pasturage or water on land on which cattle are located, the movement of such cattle will be permitted, provided:—

- (a) That such movement shall be to nearest available pasturage by the most suitable route.
- (b) That written consent be obtained in terms of Section 4 (b) hereof.
- (c) That movement shall be by permit only of a duly authorised officer, and under the supervision of a responsible white man, or of a native approved of by the Cattle Inspector and Native Commissioner of the district.

7. For the purposes of cleansing an area from disease the Controller of Stock may, on the authority of the Administrator and on the advice of the Chief Inspector of Cattle, and subject to such conditions as may be stipulated, permit the removal of cattle from a scheduled area to an adjacent clean area.

8. All applications for the removal of cattle under sections 4 and 5 hereof shall be submitted to and approved of by the Veterinary Department before being granted and when such movement is from one Native District to another the application shall be submitted for the approval of the Government Veterinary Surgeon at Bulawayo and the Native Commissioners of the Districts to and from which the removal is made.

9. All permits granted under the provisions of this notice shall specify the number and brands of cattle, route to be traversed, and time allowed for each journey; any breach of these or other conditions endorsed on the permit by the issuing officer shall be deemed a contravention of these Regulations in terms of section 14 hereof.

10. All veld-fed animals within the limits of the various Commonages or Townlands or other centres where there is common grazing ground, and wherein cases of African Coast Fever have occurred within two years of the date of publication hereof, and upon which public dipping tanks have been established, shall be dipped therein at least once every fourteen days: provided that the Controller of Stock may, on the advice of the Veterinary Department, direct the temporary suspension of this regulation for such reasons as he may regard as sufficient.

11. The following charges shall be paid at the time of dipping by the owner of the cattle or other animals required to be dipped under these Regulations in respect of any dipping done at a public dipping tank:—

|                                   |         |               |
|-----------------------------------|---------|---------------|
| For cattle (over six months)      | .. .. . | 3d. per head. |
| For horses and mules              | .. .. . | 3d. „         |
| For calves (six months and under) | .. .. . | 2d. „         |
| For small stock                   | .. .. . | ½d. „         |

with a minimum charge of 6d. for any number of animals not aggregating such fee under above tariff.

12. Any disinfecting by spraying required to be done under these regulations shall be carried out with an approved insecticide by the owner of the animals so sprayed; provided that the Inspector may, at his discretion, carry out such disinfection with the assistance of and at the entire cost of the owners of the animals to be sprayed, the cost of such disinfection being payable at the time of the spraying.

13. Whenever the owner, occupier, or manager of a farm shall adopt measures for the cleansing of his cattle running thereon, either by spraying or dipping or by any other method permitted by these or any other regulations, the Cattle Inspector may order such natives or others as have cattle on the said farm to cleanse such cattle, and the Native Commissioner of the District in which such farm is situated may enter into an arrangement with the native owners of cattle to cleanse such cattle at a charge to be mutually agreed between the said owner, occupier, or manager and the said native owners.

14. Any person contravening any of the provisions of these regulations shall, upon conviction, be liable in respect of each offence to the fines and punishments prescribed by the Ordinance, and in cases where no special punishment is provided, to a fine not exceeding £20, or in default of payment to imprisonment with or without hard labour for any period not exceeding three months, unless the penalty be sooner paid.

#### SCHEDULE.

- (1) Fingo Location.
- (2) An area within a radius of ten miles of Ntolas Kraal on the farm Emangeni.
- (3) An area comprising the farms Upper and Lower Umvutcha, Reigate, Upper Nondwene, Mapane, Government Farm No. 5, Trenance and the plots adjoining the farms Umvutcha.

No. 189 of 1906.

26th July, 1906.

#### AFRICAN COAST FEVER.

I, UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel and withdraw the regulations promulgated by Government Notices Nos. 223 of 1905 and 115 of 1906, and declare the following to be of full force and effect in lieu thereof within the Province of Mashonaland and the Fiscal Division of Gwelo as defined by the "Southern Rhodesia Boundary Regulations Amendment Regulations, 1898," which areas are hereby declared to be areas infected with a destructive disease:—

1. The movement of all cattle within the said area is prohibited save and except:—

- (a) On permission granted by an officer specially authorised thereto by the Administrator.
- (b) Within the boundaries of any single farm where such cattle are depastured.
- (c) Within any area of land enclosed by a substantial fence.
- (d) Within a radius of four miles of any native kraal situate within the boundaries of any native location or reserve and as is hereinafter further provided.

2. The movement of cattle for slaughter purposes shall be permitted under the written authority of an officer thereto duly authorised, subject to the following terms and conditions:—

- (a) That such cattle are moved to the nearest or most suitable railway station or siding, and thence by rail to the centre of consumption, or, where the district is not served by a railway, by the most suitable route to the centre of consumption, all cattle travelling by road to be under the personal supervision of a responsible white man approved of by the Cattle Inspector, or of a native approved of by the Native Commissioner and the Cattle Inspector of the district within which such movement takes place.
- (b) That the written permission of owners, occupiers or managers of all occupied land, and, in the case of Native Reserves, of the Native Commissioner of the District over which such cattle shall pass to the nearest station, siding or centre of consumption is obtained: provided that in the event of such owners, occupiers, managers, or Native Commissioners refusing to grant such permission, the Controller of Stock may direct the issue of a permit of removal if satisfied that the necessary permission is withheld without good and sufficient cause.
- (c) That such cattle shall, before being moved, be thoroughly disinfected by dipping, or spraying, to the satisfaction of the officer issuing permit, and at the expense of the owner of such stock; and where possible, be branded under the supervision of the officer issuing permit with the letters "V.D." on near side of the neck.



- (d) That such cattle shall, on arrival at the centre of consumption, subject to the terms of Clause (e) hereof, be immediately taken to the prescribed quarantine area and there be quarantined and confined and, where not branded in terms of Clause (c) hereof, be similarly branded under the supervision of a duly authorised officer.
- (e) That all cattle brought into any centre of consumption and not disinfected by dipping or spraying in terms of Clause (c) hereof shall be immediately taken to the public dipping station and there be thoroughly dipped or sprayed before being taken to the quarantine area.
- (f) That all cattle admitted to the quarantine area shall be slaughtered within twenty-one days of their admission, and under no pretext whatever shall cattle so admitted be permitted to leave the said area alive. All such cattle shall, after admission to the said area, be considered as likely to be infected with disease, and, if found wandering outside the said area or in possession of any person, may be destroyed under an order of the Chief Inspector or Controller of Stock.

3. The movement of cattle required for *bona fide* mining, farming, breeding and dairying purposes, and for private milk supplies, may be permitted on the written authority of a duly authorised officer, subject to the following terms and conditions:—

- (a) That such movement shall take place subject to the conditions set forth in Section 2, clauses (a), (b) and (c): provided that it shall not be necessary to brand such cattle as required by Clause (c).
- (b) That on arrival at destination such cattle shall be effectually isolated from all other cattle on the same land for a period of four weeks.
- (c) That the consent in writing to such movement be obtained from all owners of cattle on farms adjoining that to which movement takes place, and in the case of Native Reserves, of the Native Commissioner of the district, provided that should such consent be unreasonably withheld by any of the aforesaid persons, the Controller of Stock may direct the issue of a permit.
- (d) That such cattle required for breeding and dairying purposes or for private milk supplies, when moved to within the boundaries of the various commonages, town lands, or of grazing land common to any mining camp or other centre where cases of African Coast Fever have occurred within two years, shall, if deemed necessary by the Chief Inspector of Cattle, be confined in some enclosed place approved of by the local Cattle Inspector, and, if a case of African Coast Fever occur in such enclosure, shall not be liberated therefrom except in terms of Section 4, Clause (b) hereof, until twelve months after the last occurrence of African Coast Fever within the enclosure in which they are kept, nor shall they be allowed after liberation to run upon any of the land specified herein, unless such land has been free from African Coast Fever for a period of twelve months.
- (e) All cattle introduced in terms of the preceding Sub-section (d) shall, on arrival, if not previously disinfected in terms of Section 2, Clause (c) be taken direct to the Government dipping station and dipped or sprayed.
- (f) All cattle confined in terms of this section and all calves born within the said enclosures shall be sprayed every fourteen days as may be directed by the Cattle Inspector.
- (g) No cattle shall be moved from one Native District to another unless with the permission of the Chief Inspector of Cattle and the Native Commissioners of the districts to and from which such movement takes place.

4. All calves under twelve months old running within the boundaries of the various commonages, town lands, or on grazing ground common to any mining camp or other centres where cases of African Coast Fever have occurred within twelve months of the date of these regulations, or born thereon after such date, shall be removed to some enclosed place approved of by the local Cattle Inspector, and shall not be liberated or allowed to run at large on such commonage, town lands or common grazing ground until twelve months

after the occurrence of the last case of African Coast Fever within the enclosure in which they are confined or upon such commonage, town lands or common grazing ground.

- (a) No calves shall be permitted to accompany working cattle travelling, and all calves born of such working cattle whilst travelling shall not be removed from the place where born.

5. For the purpose of cleansing an area of disease, the Controller of Stock may, under the authority of the Administrator and on the advice of the Chief Inspector of Cattle, subject to such conditions as may be stipulated, permit the removal of calves and other cattle to an adjacent clean area.

6. The movement of working cattle other than those specified in Section 7 hereof, may be permitted within the following areas and on the terms and conditions hereinafter set forth :—

- (a) Within a radius of ten miles of any working mine, or mine in course of development, for the purposes of such mine : provided that

- (1) Such cattle shall only be moved under permission of a duly authorised Officer, and shall be dipped every fourteen days where a dipping tank is available within such area, or, in the absence of a dipping tank, be thoroughly sprayed with an approved insecticide ;
- (2) That such permission shall not be granted where it conflicts with any other section of these regulations, or, if such movement is considered to be dangerous to other cattle within the ten mile radius.

- (b) Within the boundaries of the following Native Districts, viz., Lomagundi, Marandellas, M'Rewas, M'Tokos, Makoni, Hartley, Inyanga, North and South Mazoe, Charter and Gwelo, as defined by Government Notice No. 13 of 1899, and from the farms "Shitowa" and "Soul Prop" to the Chiodzani Drift situate in the Umtali District, for *bona fide* farming purposes, subject to the following conditions :—

- (1) That the movement will be permitted for such period as the Controller of Stock may in his discretion, and on the advice of the Chief Inspector of Cattle, deem expedient, provided that such permission may at any time be withheld or withdrawn without notice.
- (2) That all applications for removal shall be approved of by the Chief Inspector of Cattle and the Native Commissioner of the District.
- (3) That the consent of owners, occupiers or managers of occupied lands, or Native Commissioners is obtained in terms of Section 2, Clause (b).
- (4) That all such cattle are dipped every fourteen days, where a tank is available, or, in the absence of a tank, are thoroughly disinfected by spraying.

7. The movement of "salted" or immune working cattle shall be permitted on the following terms and conditions :—

- (a) That such cattle have been registered and branded under the supervision of the Cattle Inspector with the brand "T O" on near shoulder and the registration number on near horn, in terms of Section 7, Clauses (a) and (b) of Government Notice No. 109 of 1905.
- (b) That the movement of such cattle shall only take place under the written permit of a duly authorised officer and subject to the condition that they are disinfected by dipping every fourteen days, where a dipping tank is available, or in the absence of a dipping tank, by thorough spraying with an approved insecticide.
- (c) That movement of such cattle shall only be permitted :—
  - (1) From the area comprised within the boundaries of the farms Mount Pleasant, Rhino Valley, Cheshire, Doorn Hoek, Vlaknek, Turner's and Sterkstroom in the Inyanga District, along the main road, between that area and the Rusapi Railway Station :

provided that such cattle are dipped at Inyanga Police Station every fourteen days, and are not outspanned within a limit of four miles of Rusapi Station.

- (2) Along the main roads between the Old Umtali Township, the Penhalonga Mine and Umtali.
- (3) Along the main road from Umtali to Melsetter and Mount Silinda and all confluent roads on the infected area.

8. In the event of failure of pasturage or water on land on which cattle are located, the movement of such cattle will be permitted, provided :

- (a) That such movement shall be to the nearest available pasturage by the most suitable route.
- (b) That written consent be obtained in terms of Section 2, Clause (b) hereof.
- (c) That such movement shall be by permit only of a duly authorised officer, and under the supervision of a responsible white man, or of a native approved of by the Cattle Inspector and Native Commissioner of the District.

9. All applications for the removal of cattle under Sections 2, 3 and 8 hereof shall be submitted to and approved of by the local Veterinary Officer before being granted.

10. All permits granted under the provisions of this Notice shall specify the number and brands of cattle, route to be travelled and time allowed for each journey, and all conditions endorsed on such permits by the officer issuing the same shall be strictly observed.

11. All veld-fed animals within the limits of the various Commonages or Town Lands or other centre where there is common grazing ground and wherein cases of African Coast Fever have occurred within two years hereof, and upon which public dipping tanks have been established, shall be dipped therein at least once every fourteen days : provided that the Controller of Stock, may on the advice of the Veterinary Department, direct the temporary suspension of this regulation for such reasons as he may regard as sufficient.

12. The following charges shall be paid at the time of dipping by the owner of the cattle or other animals required to be dipped under these regulations in respect of any dipping done at a public dipping tank :—

|   |               |
|---|---------------|
| For Horned Cattle (6 months and over) . . . . .       | 3d. per head. |
| For Horses and Mules . . . . .                        | 3d. „         |
| For Calves (6 months and under) and Donkeys . . . . . | 2d. „         |
| For Small Stock . . . . .                             | ½d. „         |

with a minimum charge of 6d. for any number of animals not aggregating such fee under above tariff.

13. Any disinfecting by spraying required to be done under these regulations shall be carried out with an approved insecticide by the owner of the animals so sprayed : provided that the Inspector may, at his discretion, carry out such disinfection with the assistance of and at the entire cost of the owner of the animals sprayed, the cost of such disinfecting being payable at the time of spraying.

14. Whenever the owner, occupier or manager of a farm shall adopt means for cleansing his cattle running thereon, either by spraying or dipping or any other method permitted by these or any other regulations, the Cattle Inspector may order such natives or others as have cattle on the same farm to cleanse such cattle, and the Native Commissioner of the district in which such farm is situated may enter into an arrangement with the native owners of cattle to cleanse such cattle at a charge to be mutually agreed upon between the said owner, occupier or manager and the said native owners.

15. Any person contravening the provisions of these regulations shall be liable to the punishments prescribed by the Ordinance, and in cases where no special punishment is prescribed by the said Ordinance to a fine of £20 or to three months' imprisonment with or without hard labour in default of payment of any fine inflicted.



## Departmental Notices.

### DESTRUCTION OF WILD CARNIVORA.

It is hereby notified for public information that commencing on 15th June, 1906, rewards will be paid for the destruction of wily carnivora, within the limits of Southern Rhodesia, on the following terms and conditions, viz. :

£2 10s. each for Lions.

£1 each for Leopards and Cheetahs.

10s. each for Wild Dogs.

5s. each for Jackals, Tiger Cats and Redcat or Lynx.

2s. 6d. each for Baboons.

1s. each for Grey Monkeys.

Rewards will be paid to Europeans by the Magistrate or Native Commissioner, and to natives by the Native Commissioner of the District.

In proof of destruction, applicants for rewards will be required to produce and surrender the skulls of lions and the tail and skin of head and neck of other animals destroyed. Of young animals, where the tail is less than six inches in length, the complete skin must be produced.

Applicants must be prepared to make a solemn declaration to the effect that the animals for which rewards are claimed have been captured and killed within the boundaries of the district of Southern Rhodesia wherein the claim is made and subsequent to June 15th, 1906.

### RABIES REGULATIONS.

The attention of all owners of dogs is drawn to Sections 6, 8, 9 and 10 of the Rabies Regulations, Government Notice No. 163 of 1906, requiring that between 1st October and 30th November, all dogs over three months old and not kept within the limits of the Municipality, town or village in which the registration of dogs is enforced, shall be registered with one of the under-mentioned officials; on registration a badge will be issued by the Registration Officer, for which the sum of sixpence must be paid, and this badge must be attached to a collar to be supplied by the owner and carried by the dog.

Any dog at large after 30th November, 1906, and not bearing a duly issued registration badge is liable to be summarily destroyed by any person.

All Native Commissioners and their Assistants have been appointed Registration Officers, and applications for registration can be made to them in person, or by letter, accompanied by the registration fee of 6d. for each dog.

For the convenience of Europeans, the following Police Officers have been appointed Assistant Registration Officers, with whom registration can be effected, as above indicated:—

|                   |   | Police Station. |                  |   | Police Station. |
|-------------------|---|-----------------|------------------|---|-----------------|
| Officer in charge |   | Gatooma         | N.C.O. in charge |   | Enkeldoorn      |
| "                 | " | Filabusi        | "                | " | Blinkwater      |
| "                 | " | Sebakwe         | "                | " | Geelong         |
| "                 | " | Wankies         | "                | " | Victoria Falls  |
| N.C.O.            | " | Sipolilo        | "                | " | Figtree         |
| "                 | " | Penhalonga      | "                | " | Ramaquaban      |
| "                 | " | Chipinga        | Trooper          | " | Essexvale       |

### FARM APPRENTICES.

The Secretary for Agriculture would be glad to receive the names of farmers who would be willing to receive young Englishmen desirous of obtaining acquaintance with local systems of agriculture before taking up land on their own account, and also the terms on which such would be received, as he is in constant receipt of enquiries for such employment.

### STRYCHNINE.

Stockowners can obtain a limited quantity of strychnine for the destruction of carnivora at a cost of 1s. 6d. per half ounce.

### DONKEYS.

The B.S.A.P. Transport Department offer two pure-bred Zanzibar donkey stallions for service. Stud fee, ten skillings. Further particulars may be obtained from the O.C., Transport, Salisbury.

### GOVERNMENT STALLIONS FOR PUBLIC STUD.

The stallions "Robber Knight," and "Dolfos" having been secured for public stud purposes in the Provinces of Matabeleland and Mashonaland respectively, will be stationed at Bulawayo and Salisbury, where a limited number of mares can be served free of charge.

Applications, giving full particulars of the mares to be served, should be addressed to the Veterinary Officers at Bulawayo and Salisbury, from whom further particulars can be obtained.

The owners of mares brought to stud will have to make all necessary arrangements for attendance, stabling and feeding of their animals, as the Department can take no responsibility whatever.

As the number of mares which can be served is very limited, the Veterinary Officers in charge are instructed to refuse service if any mare submitted is suffering from any hereditary disease or is of an inferior type.

### VAPORITE.

The new preparation, "Vaporite," suitable for the destruction of cut-worms, wire-worms, white ants, and other soil-infesting pests, can be obtained from the Department in quantities of not less than 2 cwt. at 17s. 6d. per cwt. Application to be accompanied by remittance covering cost and transport charges.

### GRAM.

A limited quantity of fresh imported seed is available at 3½d. per lb. on application to the Department, accompanied by remittance for cost and transport.

### TOBACCO SEED.

The following varieties of tobacco seed may now be obtained by planters from this Department at the prices named, which include postage. Orders must be accompanied by remittance.

| PER OZ.               |      | PER OZ.             |     |
|-----------------------|------|---------------------|-----|
| s. d.                 |      | s. d.               |     |
| Hester ... ..         | 0 10 | Bonanza ... ..      | 1 2 |
| Goldfinder ... ..     | 1 2  | Bullion ... ..      | 1 2 |
| Conqueror ... ..      | 1 2  | Sumatra ... ..      | 2 3 |
| Zimmer Spanish ...    | 1 6  | Kentucky Yellow ... | 1 0 |
| Connecticut Seed Leaf | 0 10 | Honduras ... ..     | 1 2 |
| Sweet Orinoco ... ..  | 0 10 | Cuban ... ..        | 2 3 |
| Light Maryland ... .. | 0 10 | Warne ... ..        | 1 2 |
| Medley Prior ... ..   | 1 0  | Turkish ... ..      | 1 0 |
| Glesner ... ..        | 0 10 | Latakia ... ..      | 1 0 |
| Lucks ... ..          | 1 0  |                     |     |



## PRIZE COMPETITION FOR RHODESIAN GROWN TOBACCO LEAF.

The following prizes are offered by the British South Africa Company to be awarded for the best crops of tobacco leaf grown each season during the three years, 1906, 1907, and 1908.

1. For Rhodesian grown leaf from Turkish seed and cured in the usual Turkish manner.

(a) Best crop weighing between one thousand and five thousand pounds: £25

(b) Best crop weighing five thousand pounds and over: £75.

2. For Rhodesian grown leaf from American seed and flue cured.

(a) Best crop weighing between one thousand and five thousand pounds: £25.

(b) Best crop weighing five thousand pounds and over: £75.

### CONDITIONS OF COMPETITION.

1. All competing crops must be cured, dried, packed in bales and delivered for sale at one of the Company's warehouses in Rhodesia.

2. Picked or selected exhibits representing but a portion of a crop cannot enter for competition.

3. Any or all competing crops may be disqualified by the Judges, if in their opinion they are not properly packed or in keeping condition.

4. Two Judges, both expert tobacco leaf men, will be appointed, one to be nominated by the British South Africa Company, and the other by the Rhodesian Agricultural Union. If necessary, an Umpire may be nominated by the Judges.

5. No competitor shall enter for both prizes in the same class.

6. All competing crops shall be the product of the season in which they are entered for competition.

7. Crops can be lodged at one of the Company's warehouses, which will be advertised later, any time during the season up to the end of December, but notice of intention to enter for competition should be sent to the Agricultural Department at as early a date as possible, and not later than 31st October in each year.

## Editorial Notices.

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Original subscribers to the *Journal*, who have complete sets of the earlier numbers to dispose of, are requested to communicate with this office, as numerous enquiries for the first and second volumes, now out of print, have been received.

Subscriptions to the *Journal* (5s.), issued bi-monthly, should be addressed to the paymaster, Agricultural Department, Salisbury. Only communications relating to the literary department should be addressed to the Editor, and if an answer is required in the pages of the *Journal*, should reach this office not later than the 15th of the month preceding publication. Charges for the insertion of advertisements will be forwarded upon application to the paymaster. Subscribers are requested to notify immediately the non-delivery of the *Journal*.

Farmers requiring latest market prices for produce and live stock at Kimberley, Johannesburg, Bulawayo, Gwelo, Salisbury, Umtali, and Beira, can obtain same from this office by next mail or prepaid wire.

Advertisements will be accepted from *bona fide* farmers wishing to effect sale, purchase or exchange of produce, live stock, or farm implements, at a minimum charge of 2s. 6d. per insertion of 20 words. Extra words will be charged for at the rate of 1s. for every ten words.

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## ADVERTISEMENTS.

### Farmers' Advertisements.

**T**HE Electric Steel Wheel for Wagon, Dump Cart, Water or Spring Cart; to fit any axle.—Particulars, H. Gillwald, Headlands.

### TOBACCO PLANTS FOR SALE.

Virginian for Bright Tobacco and Cigarette Leaf.

|                                 |                |
|---------------------------------|----------------|
| From freshly Imported Seed      | 10/- per 1,000 |
| From acclimatised Selected Seed | 12 6 "         |
| Turkish from Cavalla Seed       | 5/- "          |

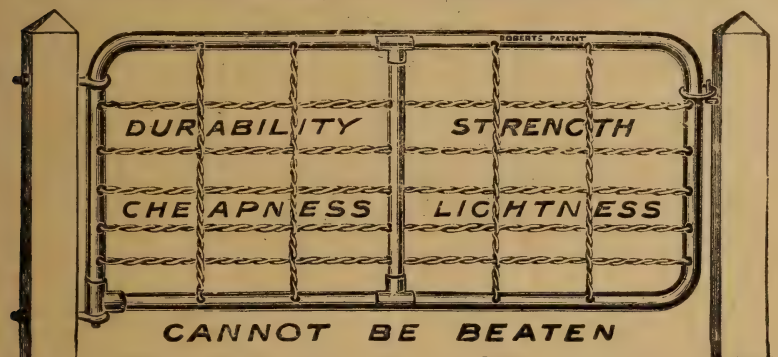
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Delivered free on farm or rail at Hunyani

B.S.A. Tobacco Plantations, Limited, Hunyani.

## ROBERTS' PATENT. Famous Tubular Gates

1st PRIZES at CAPE TOWN, PORT ELIZABETH & GRAHAMSTOWN.



| Dia. of Bars. | Length of Gate. | Price on Rail. | Dia. of Bars. | Length of Gate. | Price on Rail. |
|---------------|-----------------|----------------|---------------|-----------------|----------------|
| 1 1/2 inches  | 13 feet         | £3 5 0         | 2 inches      | 15 feet         | £3 17 6        |
| 1 1/2 "       | 14 "            | 3 7 6          | 2 "           | 16 "            | 4 0 0          |
| 1 1/2 "       | 15 "            | 3 10 0         | 2 "           | 17 "            | 4 2 6          |
| 1 1/2 "       | 16 "            | 3 12 6         | 2 "           | 18 "            | 4 5 0          |

### TUBULAR PADDOCK GATES. WITHOUT CENTRE SUPPORT.

| Dia. of Bars. | Length of Gate. | Price on Rail. | Dia. of Bars. | Length of Gate. | Price on Rail. |
|---------------|-----------------|----------------|---------------|-----------------|----------------|
| 1 inch        | 2 to 4 feet     | £1 0 0         | 1 1/2 inches  | 7 feet          | £2 5 0         |
| 1 1/2 inches  | 2 to 4 feet     | 1 5 0          | 1 1/2 "       | 8 "             | 2 7 6          |
| 1 1/2 "       | 5 "             | 1 7 6          | 1 1/2 "       | 9 "             | 2 10 0         |
| 1 1/2 "       | 6 "             | 1 10 0         | 1 1/2 "       | 10 "            | 2 12 6         |
| 1 1/2 "       | 7 "             | 1 12 6         | 1 1/2 "       | 11 "            | 2 15 0         |
| 1 1/2 "       | 8 "             | 1 15 0         | 1 1/2 "       | 12 "            | 2 17 6         |

Made of Best Wrought Iron Tubing and Galvanized Steel Wire in any length or size by

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Cape Colony.

Laced with barbed wire or covered Jackal Netting at 2s. 6d. under 9 feet and 5s. over 9 feet.

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# SUMMER PLANTING, SEASON 1906-7, —OF— **ORANGE, LEMON,** and other **CITRUS FRUIT TREES**

In all the leading varieties, Guaranteed true to name, and sold in accordance with Government Ordinance for preventing introduction of Insect Pests and Plant Diseases.

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Trees delivered free to any Railway Station in South Africa at from **2/-** to **4/-** per tree according to size of tree, and quantity ordered.

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### P.O. GROOT DRAKENSTEIN,

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— **C.C.**

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FIFE STREET, NORTH, and FIFTH AVENUE,  
~ BULAWAYO. ~



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**AGRICULTURAL IMPLEMENTS and DAIRY SUPPLIES**  
**OF EVERY DESCRIPTION.**

**THE FINEST LINE OF PLOUGHS IN RHODESIA.**  
ALL SPARES STOCKED.

**Fencing Wire & Standards. Tamlin's Incubators.**  
**Crown Separators and Churns.**

*Agents for McCORMICK'S*

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**MEALIE SHELLERS ALWAYS ON HAND.**

"Virginia," "Syracuse," "Clinton," and "Black Hawk"  
Cultivators and Weeders of every Description.

**We have the Largest and Most Varied Stock in Rhodesia.**

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ments specially  
Considered, and  
Orders Promptly  
Attended To. . .**





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Seed Oats, Wheat, Barley, . . . . .

Mealies, Potatoes, Manna, Lucerne.

Mustard Seed. Rock Salt and Coarse Salt  
in any quantity at lowest prices.

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**PURE BRED POULTRY OF EVERY DESCRIPTION.**

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Potatoes arriving in October, November and December.  
Varieties: Up-to-date, Early Rose, Sir John Llewlyn, King  
Edward VII, British Queen.

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**SEED POTATOES.**

All the Popular Varieties always on hand.

Stocks of Mealies, Flour, Salt, Oats, Bran, Rock  
Salt, Lucerne. Whip Sticks, Reims and Farmers'  
Requirements in general.

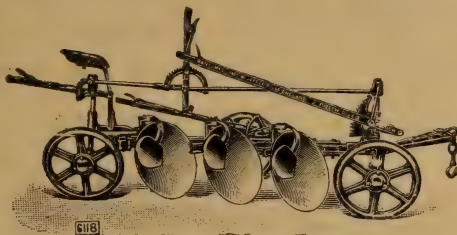
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**HIGHEST PRICES Given for Farmers' Produce.**

# AGRICULTURAL MACHINERY.

## "RANSOMES"

Disc Ploughs, all  
sizes : 2, 3, 4, 5 and 8  
furrow.



Latest Pattern.

Best in the Market.

Beats all Competitors.

"RANSOMES" Board Ploughs ; all sizes and designs.

"RANSOMES" Horse Rakes, Harrows, etc.

"ALBION" Mowers, light draught, easy running ; reliable.

"ALLAN" Oil Engines : suitable for Irrigation, Dairy, and  
General Farming work, both portable and stationary.



Breaking up Ploughs ;  
loose or fixed fore-  
carriage.

Mealie Shellers ; all sizes ; hand and power.

"MARTIN" Cultivators stocked.

Mealie Mills in great variety.

"TARRY'S" Steel Star Windmills  
in sizes 8, 10, 12, 14 and 16 feet.

"EVANS'" Pumps, to suit Mines,  
Wells, Dams, Spruits, Rivers,  
etc. : both for hand and  
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A full Stock of General Ironmongery  
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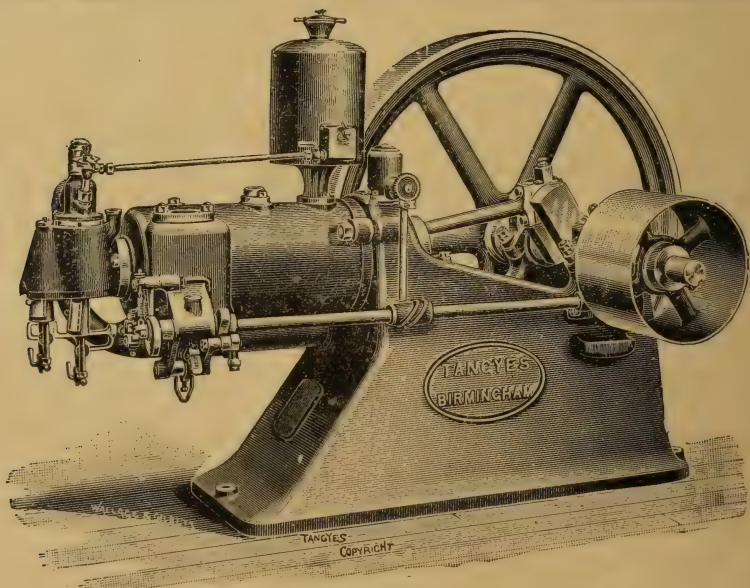
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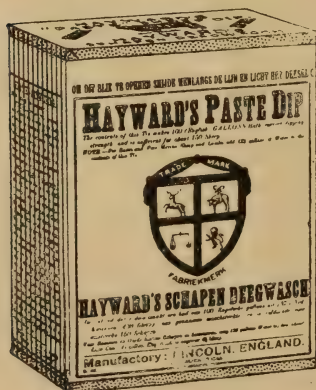
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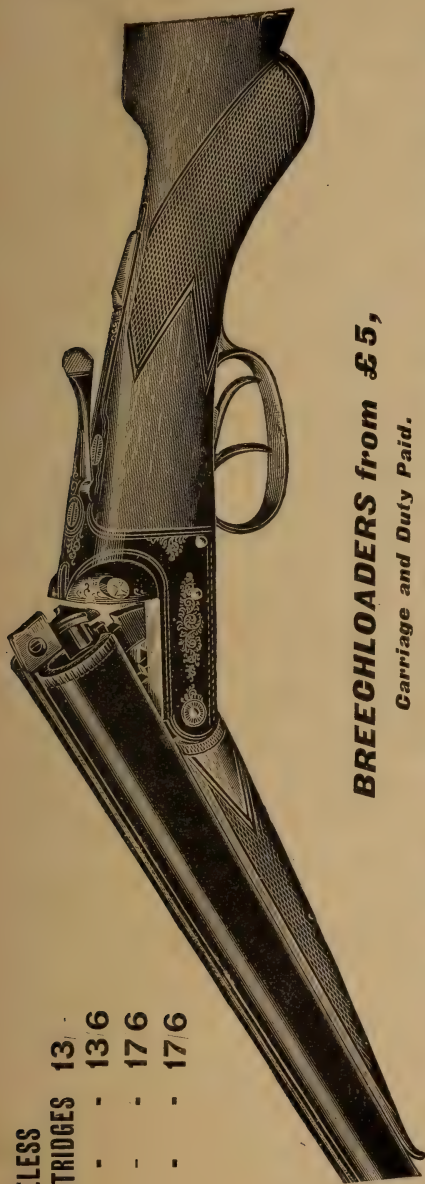
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# THE RHODESIAN AGRICULTURAL JOURNAL

• Issued by the Agricultural Department.

EDITED BY L. A. KING-CHURCH.

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VOL. IV.—No. 3.]      FEBRUARY, 1907.      [5s. per annum.

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## Editorial.

—————

Two communications of a very encouraging nature have recently been received from correspondents to the Journal, the one giving the expert report on a consignment of Rhodesian rubber, another announcing a consignment of Rhodesian wool exported to England.

The report on the rubber, decidedly favourable as it is, holds out most pleasing prospects for the future of the rubber industry in Rhodesia, especially when it is remembered that this report, by an expert on rubber from all parts of the world, was in this case on samples of rubber prepared apparently without any mechanical appliances, and by no means specially “got up” for exhibit, as the writer tells us. Such favourable results almost give us the right to look for far greater and more successful production as the industry develops, and to hope that every possible facility and assistance will be afforded to prepare the raw material in such a form that it may show to the greatest advantage and satisfy the requirements of the home markets.

Particular attention is drawn in the report to the cleanliness and freedom from impurities of the samples submitted. Almost as great a value seems to be attached to this merit as the quality and colour of the rubber itself. If this merit of purity is so highly esteemed by the merchants at Home, then Rhodesian

planters must look to it that every endeavour be made to build up an unfailing reputation for this one especial excellence, which must surely bring with it those other desirabilities, fine quality and good colour, by preparing with equal care all future consignments, always remembering that it is easier to maintain a good reputation, than to retrieve a lost one.

Rubber is every day becoming more and more essential as a commercial product. Already the enormous strides taken within the last few years by the motor car industry has greatly increased the demand, while in the electrical world it is being used in great quantities for insulating and other kindred purposes. We may fairly expect some advantage to accrue to Rhodesia at a time when it is being made the scene of the biggest undertaking for the supply of electric power that the world has ever known.

In the other communication, Mr. Weinhold, of Rhodes Farm, Inyanga, announces that he has this season exported some twenty-three bales of wool to England, seven of greasy wool, weighing 2,050 lbs., and sixteen of scoured, weighing 3,245 lbs.

This again is a matter of sincere congratulation to the pioneers of the wool industry in Rhodesia, and it will be interesting to hear whether the report on this consignment of wool is as satisfactory as that already received on the rubber. The Inyanga District is generally agreed to be an excellent tract of country for Merino sheep, and it is greatly to be hoped that the wool industry, so profitable as it is, may come to be yet another of Rhodesia's great self-producing occupations.

It is never wise to put all ones egg's in the same basket, particularly in a country like this. If locusts are to become such a scourge as to endanger all green crops, the production of wool, and the rearing of good slaughter oxen and sheep should occupy a fair share of the agricultural farmer's attention. Locusts at least cannot destroy these.

It is undoubtedly sound policy on the part of the Agricultural Department to import pure-bred bulls and rams and cross-bred ewes for sale to farmers, and judging from the prices paid at the last auction sale, this effort of the Government is duly appreciated. No doubt there are still many others awaiting the opportunity of purchas-

ing at the next sale a pure-bred bull for grading up their herd of native cattle.

These importations by the Department are a great advantage to the farmer, especially at a time when the movement of stock is to a large extent restricted, and also in reducing the risks to a minimum compared with those taken by anyone importing on their own account.

With these facilities offered, any man having a definite object in view, should be enabled in a few years to grade up his present stock into a valuable herd of slaughter or dairy cattle.

Here it is advisable to sound a note of warning, especially in view of the "open air" treatment of cattle in this country. It must be remembered that the nearer that stock approaches to being pure-bred the more care and attention they will require. Efficient shelter from cold winds and rain will have to be provided in the kraal where they are housed for the night, and ample provision made for keeping up their condition through the winter months.

Persian sheep should prove very suitable for this country owing to their hardiness and early maturity. Moreover, as they appear to be comparatively immune to heart-water and blue-tongue, they and their crosses will do well where woolled sheep will not thrive.

The first volume of the South African Stud Book, just published, reveals the pleasing fact that there are now in the different South African Colonies a large number of pure-bred stock; and considering the short time that has elapsed since the war, this is a most encouraging sign. At a not far distant date it is to be hoped that Rhodesia too will be able to add largely to this valuable record of pedigree stock.

There is no scheme of co-operation, however small, but deserves the utmost efforts of everyone concerned in it to make it a success. To take a case in point, we instance the scheme of the locust campaign, which though by no means small, being as it is a united effort on the part of all the South African Colonies to eradicate or at least control the scourge of locusts. This scheme is at present engaging the serious consideration of the leading Entomological experts throughout the sub-continent. Scarcely any price would be too great to pay if only the pest could be got under control.



Drought and bad seasons are yearly becoming less disastrous, owing to improved methods of cultivation, but in the very best of seasons, all the labour may be spent in vain if locusts appear in their millions and settle on the growing crops.

Locusts and hailstorms are probably the two most destructive, and at the same time the most difficult enemies of the farmer. Attempts are now being made to control the former, possibly the results of the latter may in time be discounted by some system of insurance such as already exists in parts of Italy.

Large quantities of fruit are at the present time coming into the country from Cape Colony. How long will it be before home-grown supplies will be sufficient to satisfy the local demand. The Inyanga farmers prove to us that we need not look for fruit from outside if local growers will work up their orchards on enlightened lines, and pay due attention to the grading and packing of their fruit, as do the importers, so that, when they are in the position to supply the market, they may not lose anything by being behindhand in either of these two important points, they should ere long be in a position sufficiently secure to defy competition. Full advantage should be taken of all the experiences of the older colonies, and a start should be made from the point of excellence to which they have now attained.

Ramie has passed through many vicissitudes since its cultivation was first advocated in the British Colonies. One of the chief drawbacks has been the difficulty in procuring suitable machinery for extracting the fibre. A Ramie Growing Association has now been formed, and renewed efforts are to be made to encourage its growth. It is impossible to prophesy whether it will become the basis of the fabrics of the future, as some people would have us believe, but there is no doubt that the article manufactured from Ramie fibre has advantages over silk and cotton goods, especially in point of strength and wear.

In the event of a suitable decorticating machine being put on the market, a big demand for the fibre is likely to arise, and as it is a nursery plant, it would seem advisable always to have a small number of plants on hand, so as to be ready to grow it on a commercial basis, what time the demand arises.

## **Agricultural Statistics.**

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On November 8th a circular was sent by the Agricultural Department to all the farmers in Rhodesia, asking for information regarding the state of agriculture generally.

It is earnestly requested that all farmers will reply on the forms supplied with this circular, and post these replies as soon as possible, so that they may reach the Department not later than March 31st, 1907.

All replies as stated in the circular will be treated as confidential, but unless reliable information is supplied for the use of the Department, the Secretary for Agriculture is severely handicapped in obtaining those facilities for farmers which are constantly being asked for.

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### **Veld Hay.**

It is now generally acknowledged that for stock farmers and dairy men, a good supply of winter forage is an absolute necessity, if they wish to maintain their stock in good condition, and their cows in full milk.

Many a lamb, too, that otherwise would die of poverty, or have to be killed to save the ewe's life, can be saved if there is some stored forage with which to feed the ewes before the grass begins to flush.

In many parts of South Africa it has been the custom during the dry winter months to trek to the low veld, where water and grass are generally to be found in sufficient quantities to keep the stock alive, but owing to the increase of fencing, and to the regulations in force with regard to the movement of cattle and sheep for the stamping out of disease and scab, this annual trek has to a large extent been rendered impossible. The result is that those farmers have been obliged to cut and stack the veld grass for winter use, and by so doing have found that they run much less risk of losing stock than under the old system.

It is well to lay down as a necessary provision for winter feeding that for nearly five months in the year, forage of some sort should be regularly fed to cattle, to eke out the scanty living they can pick up on the dry veld.

The period during which cattle and sheep require extra feeding, varies from year to year, according to whether the rains are early, or late, or both, but it is always advisable to make ample provision for the length of time stated above. In the Transvaal and other Colonies, at the various experimental stations, many experiments have been conducted to test the most suitable grasses for winter pasture, but until some corresponding tests have been made in Rhodesia to discover which grasses will withstand the local climatic conditions and remain green throughout, no winter feed can be more easily or economically saved than well-cured veld hay.

Such hay consists of the stems and leaves of grasses which have been cut and dried by exposure to the sun and wind. The grass should be cut when in full bloom, and before the seeds have formed, and while the stems are still succulent. If left till too late, the stems become fibrous and woody, and lose most of their nutritive value.

The grass which is cut late in the season, especially if it has been touched by the first frost, and consequently has dried out and turned brown, has very little feeding value. The difficulty generally experienced, earlier in the season, of saving the grass without getting it wet, usually deters farmers from cutting till the weather is more settled, but if the opportunity is seized, during a dry spell to cut the grass when most of it is in flower, the yield per acre would be smaller, but the resulting hay would have a much higher feeding value.

In case of uncertainty when to cut, it should be borne in mind that it is better to cut hay too soon than too late.

Hay is easily spoilt if exposed to rain after being cut, as the washing of the rain removes many soluble matters in the form of albumen, sugar, and gum; while if stacked while still wet, it quickly ferments, the sugar being converted into alcohol, which acts on the chlorophyll, or colouring matter in the grass, turning it yellow, and thereby spoiling its appearance. Moreover, the alcohol also destroys the fragrant principle of hay, and makes it less palatable to stock. Yet another evil to be avoided is "sunburn," which produces much the same result as too much fermentation.

Veld is gradually improved by being mown, as it does away with the necessity of burning off the grass, and so enables the smaller and more delicate grasses to get a



better chance of thriving; while the decayed vegetable matter, which goes to provide that most valuable constituent "humus" to the soil is not destroyed. The cutting should be done with a mowing machine, which can be drawn by either oxen or mules, and although mules are probably most suited to this work, four quick oxen generally travel fast enough to give satisfactory results with most machines. An ordinary horse rake, the wider the better, or more satisfactory still, a side delivery hay rake is the only other instrument absolutely necessary for making hay.

Care should be taken that only so much hay is cut each day as can be raked up and put into cocks before night. During the hot summer days, it is not necessary to leave the grass more than a few hours in the sun, in fact the sooner it is raked up into rows and cocked the better, as the wind penetrating through the cocks is sufficient to dry the grass, while only the outside layer will be affected by the burning heat of the sun, thus preserving the colour and fragrance in the hay.

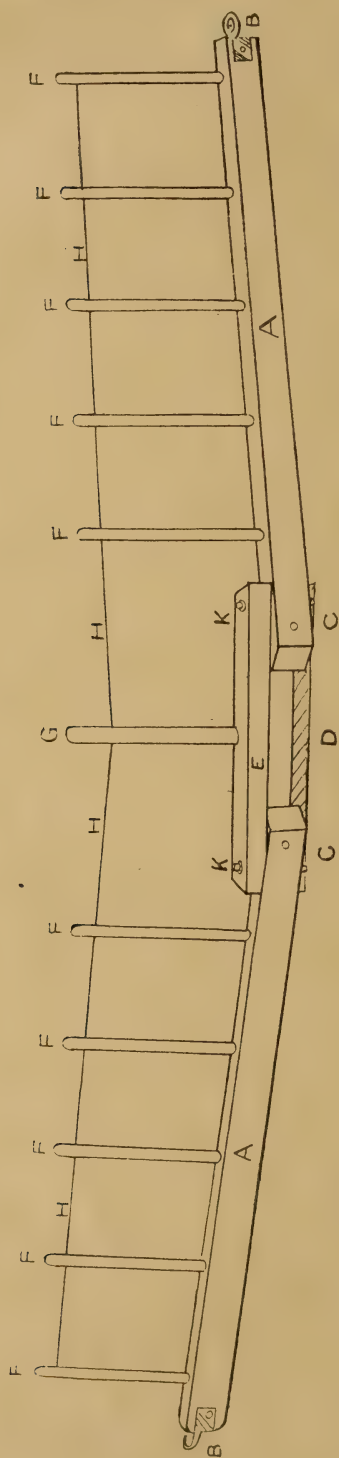
If it is intended to bale at once, it is a good plan to collect together all the hay which has been cut during the day near the baling machine, cover it with a wagon sail during the night, and bale it next morning, while the dew is still too heavy on the uncut grass to allow the mowing machine to work.

The most suitable baling machines are the Eli or the Steele Beauty; they are both mounted on wheels, and can easily be moved to any part of the farm. These machines are rather expensive, but they could be purchased with advantage by a group of farmers on the co-operative system, as it is not essential to bale hay as soon as cut, but it is work that can be done while other work on the farm is slack.

Either of these machines can easily be driven by one horse or two oxen, provided two can be found which will constantly travel in a circle, without becoming giddy.

These hay presses make bales weighing from 56 to 80 pounds, according as they are set, and of a convenient size for handling and storing.

A very useful contrivance for use during hay-making is a hay slip, for collecting together the hay after it has been put into cocks. This can easily be made on the farm, the only extras being a few strong bolts and an iron plate.



HAY SLIP

With the help of the illustration and the following description, no difficulty should be found in constructing one:—Cut two straight poles, twelve feet long each, and roughly square, to measure about eight by eight inches. At each end of these poles bolt on a staple (*b*), to which to attach the trek chain. The other ends (*c*) of these two poles are connected together; at the bottom by an iron plate (*d*) five-eighths of an inch thick, 8 inches wide, and 4 feet long; on the top by a piece of 4 x 4 inch timber (*e*) 4 feet long, leaving the two ends of the poles about two feet apart, thus forming a kind of hinge. On the upper side of each pole bore five holes, two feet six inches apart, into which insert either wood or iron uprights (*f*) three feet six inches long, and two inches square; one upright (*g*) is also placed in the middle of the 4 x 4 timber used to join the two poles together. About four inches from the top of the uprights bore a small hole, through which run a flexible wire, fastened to the two end uprights. To strengthen the slip it is advisable to put a bolt through each pole at (*c*) to prevent the bolts (*h*) from being dragged out, which sometimes happens if a very heavy load is collected.

To use the slip, hitch eight or ten oxen on to each end, allowing a length of two trek chains between the after oxen and the slip to avoid its lifting. The slip is then taken to the far end of a row of cocks, the oxen placed parallel on either side of the row, and the slip at an obtuse angle across the row. On starting, the slip may be found inclined to ride over the first lot of hay, but this can be avoided by the driver standing on the middle to keep it down with his weight until the first cock or so is gathered.

These slips are by far the easiest means of collecting hay in quantity, and bringing it up to the stack. A wagon may be used, but this requires at least five boys and the work of pitching up the hay is heavy, after which it has to be roped, and then the load is only about a ton; whereas with a slip, eight or ten oxen on each side, one driver and two leaders, as much as five to six ton can be moved at one journey, drawn close up to the stack, the oxen reversed, and the slip put ready at once to fetch another load.

If hay is not baled at once, but put into stacks, it is advisable to sprinkle over it from ten to twenty pounds



of salt per ton. This checks fermentation by absorbing moisture, destroys fungi and insects, and is also a condiment to stock, rendering badly made hay more palatable.

Good hay should come out of the stack quite green, but if it comes out brown and brittle, it has either been cut too late, or too much cured.

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## Notes on Citrus Culture.

*(Continued.)*

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By R. McILWAINE, M.A., LL.B.

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### IV.—FERTILISERS FOR CITRUS TREES.

Although the majority of Rhodesian soils are sufficiently rich for the growth of citrus trees until they attain a bearing age, the judicious application of fertilisers in sandy soils and in localities where the elements of plant food required by the trees are badly proportioned, does much to produce well-balanced trees and accelerate results.

The chief authorities on the subject of fertilising are opposed to the application of the ordinary farmyard manures, on the ground that they have a tendency to produce die-back and unhealthy roots; it is also supposed to impart thickness to the skin of the fruit. It would appear, however, that the chief danger lies in bringing stable manure into close contact with the roots, and the risk of injury is very remote if only small quantities are well incorporated with the soil at such a distance from the roots as to reach them gradually, and over a lengthened period.

Before the bearing age has been reached, the object of fertilisation is to promote good healthy growth, in the case of mature trees attention must be directed to the production of a good quality of fruit, and the systematic replacing, in their proper proportions, of the ingredients removed from the soil by the crop. Young trees are engaged in producing leaves and shoots for which a large supply of nitrogen is required; bearing trees do not

grow rapidly, but require an abundant supply of phosphoric acid for the formation of fruit.

The analysis of the orange tree and fruit show that the ideal fertiliser for young trees would contain about 4 per cent. nitrogen, 8 per cent. potash, and 6 per cent. phosphoric acid, whereas for bearing trees the percentage should be about: nitrogen  $3\frac{1}{2}$ , potash 12, phosphoric acid 8.

No definite rules can be laid down as to the amount of fertiliser to be applied, for, as can be readily understood, this will depend on several considerations, such as the natural fertility of the soil, the age of the trees, and their disposition to over or under-bear.

On poor soils it is well to incorporate a pound or so of fertiliser at time of planting, and thereafter to apply such amounts as will produce a healthy growth, being always careful to guard against over feeding, which is no less disastrous in the vegetable than in the animal kingdom. The grower's first study should be to render himself familiar with the qualities of his soil; the required quantities and proportions of fertilisers can then be applied with intelligence; if, for example, recourse is had to the use of leguminous cover crops, it may be found possible, or even necessary, to dispense with nitrogenous fertilisers.

The effects of nitrogen are seen in strong sappy growth, and a dark green glossy foliage. To the ordinary eye the appearance of the tree is extremely healthy, but an excess of nitrogen favours die-back, impairs fruitfulness, and thickens the rind of the fruit. The absence of sufficient nitrogen is evidenced by stunted growth and a yellowish coloured foliage.

Potash is the chief element in the formation of the woody portions of the trees. It tends to thinness of rind, and is believed to increase the keeping qualities of the fruit.

Phosphoric acid performs a very important roll in the production of healthy trees and fruit; it is absolutely necessary to the normal development of the fruit, its absence will retard the ripening of the crop.

The above are the chief elements to be considered in artificial fertilisers, but in order that the trees may make full use of the nourishment offered, as already indicated, care should be bestowed on keeping up a good supply of humus in the ground. On the whole, Rhodesian soils

appear to be somewhat deficient in lime, its application, especially in acid soils will be productive of the best results in counteracting acidity, decomposing humus, and liberating the fertility locked up beyond the reach of the roots.

In a young grove, fertilisers should be placed around the trees within reach of the feeding rootlets; in the case of full grown trees it may be sown broadcast and incorporated in the soil by cultivation.

## V.—IRRIGATION OF CITRUS TREES.

Citrus trees being evergreen, and having a large leaf area combined with almost continuous activity, it is impossible to secure profitable trees without ample water, whether obtainable in the form of rain or by artificial means.

The amount of water actually required will depend to a great degree on the nature of the soil, and the means employed in conserving moisture. In California, where citrus culture has been carried on with the utmost skill and intelligence, it is considered that thirty inches is the minimum required. The rainfall there varies in the several districts from about 10 to 20 inches, hence it will be seen this has to be supplemented to a great extent by artificial means. In Florida the rainfall averages about 50 inches, and no artificial application of water is necessary.

In Rhodesia the rainfall appears to average over 30 inches, and the majority of the soils are probably as retentive as those of California, and more so than those of Florida, hence it is a fair assumption that if the most is made of our rains, no artificial irrigation will be necessary. How to make the most of our rains has been made clear by the experience of other countries; briefly put it is this: Keep your soil in such an open condition that it will absorb the maximum amount of the rainfall, and as soon as the rain is over, and the ground will permit of working without clogging, carry out shallow cultivation of the surface soil at frequent intervals, say every ten days; this will form a dry surface mulch which interrupts the capillary action of the soil, and so prevents evaporation. This continual stirring of the soil draws up the moisture from below just in the same way as a lump of



sugar placed in contact with a cup of tea draws up some of the contents of the cup, but if the intervals between cultivation are too long, the moisture will disappear from the top soil layers, and shallow cultivation then will no more restore the water, than the sugar will absorb the tea if held over but not in contact with it.

Dry cultivation is a subject which merits the most careful study of not only fruit growers, but also the general farmer. Not long ago I was in a certain district where the drought had been somewhat prolonged, the farmers were surprised and delighted with the extraordinary vitality of their mealie crops under the adverse circumstances; to me the matter did not appear so wonderful when I learned that this was the first year in which a thorough use had been made of the cultivator and weeder, the result being not only freedom from weeds, but also a conservation of moisture which has been the salvation of the crop. I would again repeat that dry cultivation to be of any use must be thorough and continuous, any falling off will result in the want of moisture just when it is chiefly required at the period of flowering and setting of the fruit, which in this country is in advance of the rains.

Conservative people who will adhere to artificial irrigation, should at least bear in mind the injurious results likely to arise from the application of water in hollow basins round the trunks of the trees, apart from the likelihood of disease resulting from this practice; it has the disadvantage of placing the water in a position of little benefit for, except in the case of very young trees, the bulk of feeding rootlets are at a considerable distance from the base of the tree.

*(To be continued.)*

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## **Green Manure.**

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Cultivated lands, and more especially orchard lands, which are not frequently manured, cannot be expected to go on producing crops, from year to year, without in time becoming impoverished. In this country, where the use of artificial manure is practically impossible on

account of the prohibitive expense entailed, and where kraal manure is not to be obtained in any large quantity, some substitute must be looked for, which can take the place of these manures, until artificial manures can be obtained at a price which makes their use profitable, a state of affairs which will very probably be brought about when the system of co-operative purchase among farmers comes into vogue. In the meantime the best and cheapest method of replacing the plant food removed from the soil by constant cropping is achieved by growing and ploughing under green crops, such as clovers, vetches, beans, peas, and all other leguminous plants that may be found to grow well in this climate.

It has long been known that leguminous plants have the property of absorbing through their roots with the assistance of certain bacteria present in the soil the free nitrogen of the atmosphere, some of which goes to feed the plant itself, while the remainder becomes soluble in the soil, and available as plant food for the subsequent crop.

However, it was found that these particular bacteria were not present in all soils; the result being that leguminous crops, grown in such barren soils did not produce these root nodules which indicate that they are fulfilling the purpose for which they were principally sown. Many experiments were made to isolate this particular micro-organism, and collect it in such an available form, that it could be used either to inoculate the seed or the land before sowing; in many cases, however, these inoculating mixtures failed to produce the desired effect, and their use has to a great extent been discontinued. The safest means of inoculating a barren piece of land is to spread over it soil taken from land on which legumes have previously been grown, and which is known to contain the necessary bacteria. This method is slow and probably expensive, but it has the advantage of being more certain in results than any other system known at present.

If leguminous crops have not previously been grown for use as green manure, a trial plot should first be made, to discover if the soil it is proposed to enrich contains these bacteria, which will easily be ascertained by examining the roots, and observing if they are plentifully covered



Mr. Maclaurin's Orchard, near Salisbury, sown with Kaffir Beans for Green Manuring.



Another View of Same.



with small lumps or nodules, which indicate their presence. For sandy soils, which become exhausted much sooner than heavier land, the most suitable crop to grow for this purpose is without doubt lupins. This plant will grow in practically pure sand. Vetches are another suitable crop for sowing in sandy soil. If it is desired to cut and use these as forage, they are better sown with equal or double their quantity of oats, as the oats give some support to the vetches, and assist in keeping them off the ground. The mixture should be ready to cut from twelve to fourteen weeks after being sown. For deep, rich soil, cow-peas are the most suitable crop; they have also the advantage of being able to resist a considerable amount of drought, in fact they are often damaged by too much wet weather. They can either be sown in drills two and a half feet apart, at the rate of sixty pounds to the acre, or broadcast, using about double the amount of seed. On old land it is generally sufficient to thoroughly cultivate or disc harrow the land before planting. This is a very valuable crop to use as green manure, but if grown for hay, it should be cut when the peas are well developed, and the leaves are beginning to turn yellow. The less it is handled after being cut the better, as the leaves when dry become brittle, and a considerable quantity may be lost if moved about too much.

Mr. H. W. Potts, Principal of the Hawkesbury Agricultural College, who has made a special study of the bacterial aspect of green manuring, reports:

"Not the least interesting feature of the important green manuring experiments conducted in the college orchard, were the observations taken at regular periods to note the fixation of free atmospheric nitrogen by the bacteria located in the nodules of the plant rootlets.

"This inexpensive process of accumulating and assimilating the most serviceable of all plant-foods has a peculiar attraction for everyone engaged in orchard work and farming.

"The air we breathe contains about four-fifths nitrogen and one-fifth oxygen. It is thoroughly well ascertained that this illimitable store of plant food, through the agency of bacteria, can be rendered constantly available to replace or supplement the existing supplies of nitrogenous manures under the most economical conditions. It can be clearly illustrated that these micro-organisms

live in the soil, and enter the tissue of the rootlets of leguminous plants, forming thereon lumps, knobs, nodules, tubercles, warts or warty excrescences which at one time were looked on as evidences of disease. Fortunately now we are able to recognise their beneficial functions, and welcome their appearance.

"Their propagation and development are fostered to our advantage. Such depends on the character of the soil, temperature, moisture, the chemical bases available and the variety of soil bacteria. It is not yet ascertained, nor can it be definitely stated, how the legume and micro-organism combine to free nitrogen; most authorities agree that it is through the roots and the nodules and the air contained in the interstices of the soil, but the fact is none the less apparent that this essential plant-food is made soluble and available, and is followed by undeniable proofs of increasing fertility.

"A well aerated soil is a cogent factor to the vigour and activity of soil-bacteria. This is obtained by cultivation, ploughing, the action of earth worms, decaying rootlets, and other forms of soil movements. Light, sandy soils are invariably more suitable for this class of fertilising agency.

"It may be found necessary to utilise light dressings of soils taken from lands where legumes have been successfully grown upon soils that are lacking in suitable bacteria, or are practically sterile. This form of inoculating soils is now becoming popular and profitable.

"It has been known for centuries that leguminous plants possessed a remarkable power of renovating soils. It is only during the past fifteen years bacteria were recognised as the fertilising agents. Such restorative power is now known to be vital during the life of the plant. In addition, however, it possesses the advantage when ploughed in green of providing humus, for such it may be considered the most important of all factors in light, dry soils for increasing their water-holding capacity. No one can gainsay the value of such an important characteristic in our exhausting climate, as that of moisture retention.

"The activity of the bacteria and their functions, or in other words the process of nitrification, is largely controlled by the nature of the soil. In light, well aerated

soils, nitrification possesses all the stimulating influences essential to its vigour; and the green plants can be turned in with the prospect of a good return; but in heavier soils, owing to the presence of large quantities of decayed vegetable matter and the absence of air, the opposite effect is encouraged and denitrification takes its place, by which plant-food is rendered unavailable.

"In the latter instance, practice has to be shaped to meet these altered conditions. It is then best to partially feed off the dense green foliage with sheep. They contribute a quantity of manure, but what is of greater moment, they bruise and break up the remainder of the crop, so that it becomes partially decomposed or rotten before being turned in.

"Clover, trefoil, lupins, and vetches are noted for growing well on light soils, in fact on land so sandy as to be found almost sterile.

"But the question of a proper legume from which to acquire the best results can only be determined by actual experiment. The legume that grows most luxuriantly upon soils not well fertilised, at the same time producing the most abundant crop of nodules on the rootlets should be selected. The character of these growths cannot be estimated as a result of one year's growth.

"The soils in the College orchard are of such varied classes that it would be a huge task to accurately arrive at the amount of nitrogen accumulated during the past five years. It may be approximately estimated at from fifty to a hundred pounds per acre.

"The first crop of vetches examined during the winter of 1902 on the sandiest portion of the orchard pointed to exceedingly light nitrification. The nodules were very few, and were clustered around the base of the rootlets within an inch of the soil surface. The long fine rootlets were delicate and clean, with a general failure of vigour in growth.

"The following winter a distinct improvement was observed; the nodules were more numerous, and extended downwards some four or five inches into the soil. This winter a prolific growth of nodules were present along the line of all the sturdy rootlets, some descending to a depth of eleven, twelve, and thirteen inches, and nitrification proceeding with full power and accumulating vigour."



Some experiments conducted at one of the experimental farms in Canada, show that a large increase in yield may be obtained from ploughing in green crops. After cropping the same ground continuously, for ten to eleven years, with wheat, barley, and oats, it was found that those plots, on which artificial manures, but no kraal



Apple Tree, 3 years old, in Mr. MacLaurin's Orchard.

manure had been used, were much depleted of humus, and hence its power of holding moisture had been lessened, and the conditions for plant growth, apart from the question of plant food, had on this account become less favourable. The experiment was then made of sowing ten pounds to the acre of red clover seed on all the

plots of wheat, barley and oats. After the grain was cut, the young clover plants made rapid growth, and when a thick mass of foliage was developed, it was ploughed in.

Marked benefits were observed on all the plots so treated. Oats which had been well fertilised for ten years with artificial manures giving an average crop of 44 bushels 30 pounds per acre, with the discontinuance of the fertilisers and the use of clover, the crops in bushels and pounds per acre for the five succeeding years was 58.18, 65.15, 56.15, 57.27, and 47.27. These figures show an average increase in the crop of oats for the five years of 12 bushels 14 pounds per acre, or more than twenty-five per cent.

Similar satisfactory results were obtained with the wheat and barley, the increase in yield for wheat varying from ten to forty per cent. per acre; and for barley, from fifteen to forty-eight per cent. per acre.

The result was still more marked with Indian Corn (mealies probably grown for fodder). One plot, which after ten years' continuous cultivation with the same crop, was reduced to about two tons per acre. With one crop of clover, turned under, the yield of Indian Corn was increased to over eight tons per acre. On another plot the average of ten years was thirteen tons, 1,090 pounds per acre. The ploughing under of a single crop of clover raised this the following season to 26 tons 505 pounds per acre.

Turnips and mangels were also found to respond readily to this treatment, the increased yield in the former case being fifty per cent., and for mangels twenty-five per cent. Many similar instances could be given, but enough has perhaps been presented to establish the fact that the ploughing under of clover gives a large increase to the crop which follows, and in addition to the fertilising material contributed by the clover, the humus thus added to the soil conserves moisture and enables the rootlets of the growing plants to utilise a larger proportion of the plant-food which the soil contains.

*Appendix to the Report of the Minister of Agriculture,  
Experimental Farms, Canada.*

## Lucerne.

Among fodder plants there are few that give such general satisfaction as lucerne, which not only on account of its high feeding value, but also its thorough fertilising of the soil, is a crop that should receive earnest attention at the hands of the farming community. There must be few farmers than cannot find a ready use on their own farms, or a profitable market elsewhere, for either the green fodder or the dried hay that they would with little labour and trouble, except in the initial stages, be able to produce from their lucerne lands. Moreover, the benefit derived from its fertilising agency is in itself almost a sufficient argument in favour of its cultivation. It is one of the most useful leguminous plants for collecting and storing up in the soil the available nitrogen of the atmosphere. It not only pays its way as a forage crop, but when the land on which it has been grown is broken up, it is found to have been greatly increased in fertility through the agency of lucerne. Moreover, by reason of its deep-rooting habit it "lightens" the soil to a considerable degree, enabling the succeeding crops to penetrate far deeper into the sub-soil for moisture, and so affording it a firmer hold on life in case of a severe drought.

It is a well-known and generally accepted fact that lucerne can be grown most successfully under irrigation, but it is left to the individual farmer to test it thoroughly under purely natural conditions and without artificial watering. A fair trial should be given it on dry lands, extending over a period of some two or three years, if only for the sake of the valuable crop of hay which it will, if successful, produce during the summer months. This will quite possibly not meet with the approval of many, who will grudge the time and expense entailed in such experiments. But it is by no means necessary or advisable to conduct experiments on a large and expensive scale. Quite small patches will prove equally truly and far more economically than large areas. The value that is set upon lucerne in other great agricultural countries shows how advantageous a crop it is, and no grower of lucerne, once he has mastered the management necessary to its successful growth, will ever repent what trouble and expense it may have cost him.



Whether the first attempts to get a good stand of lucerne on dry land be successful or not will of necessity depend largely on the conditions attending the sowing. If shortly after the sowing there does not follow a good rain, the seed may possibly fail to germinate, while if after the seed has germinated a dry spell sets in, it may happen that the plants will "dry off" owing to the roots not having penetrated sufficiently deep to obtain their due share of moisture from the sub-soil. Weeds again, if their growth gets the upper hand, will kill young lucerne. Still, in spite of these possible set-backs, with favourable weather conditions and good and constant cultivation, there is no reason why lucerne should not be grown with great success on un-irrigated lands. True, there will probably be no return the first year, and it should not be expected, as lucerne usually takes about three years to come into full and profitable bearing.

*Suitable Soils.*—It is a fallacy to imagine that lucerne will overcome weeds. On the contrary, the difficulty often is to prevent it being itself outgrown and choked by them when still in its young state, so that where possible it should not be sown in old lands, especially old mealie lands, where weeds will in all probability prove very troublesome, unless some system of constant and careful weeding can be employed. If it must be sown on land that has been previously cultivated, then it should follow a good cleaning crop, such as potatoes or roots. Soils which "lift" are unsuitable, as on such land the plants will "dry out." On badly drained lands, too, such as vleiland, where the water approaches near the surface, it will not be successful. In this class of land the presence of too much almost stagnant water near the surface causes the roots to rot. To ensure the best results, it is well to sow only in deep, well-drained newly-broken land, where all the conditions favourable to its growth are more likely to be found.

The best means of getting a good stand of dry lucerne is to sow in January and February in drills 9 to 12 or 15 inches apart, at the rate of about 15 lbs. to the acre. The most important thing in buying seed is to get it free from Dodder or Cuscuta Seed. It is worth paying extra for seed that is guaranteed free from this parasite, as if the crop becomes badly infested with it, the whole will have to be ploughed in or cut, and burned on the spot, to prevent

the weed being distributed over other parts of the farm, and finding its way into paddocks where it has not previously existed. In the Argentine the standard for lucerne seed is 1 Dodder seed to 476,000 lucerne seeds, or 1 Dodder seed in 2.2 lbs. of lucerne seed. All seed should be purchased from a reliable firm, subject to a guarantee of purity, genuineness, and high germinating power. As an example of what mischief may be done by sowing seed not sufficiently cleaned by proper machinery, a sample of clover seed containing less than 1 per cent. impurity, had 3,000 weed seeds to the lb., while another containing  $2\frac{1}{2}$  per cent. impurities had 27,600 weed seeds to the pound of clover seed. Weeds sown in this way have an equal chance with the crops among which they grow, and are naturally a source of considerable loss and expense in eradicating them.

Lucerne is rich in albuminoids, which go to form the blood, muscle and bone in animals, and if fed in connection with food rich in carbohydrates, such as mealies, oat-hay, and mealie fodder, forms a well-balanced ration for all stock. Ostriches thrive well when fed entirely on lucerne, and where it is grown under irrigation, it will support five to the acre, provided arrangements are made to fence off separate paddocks, so that one may be irrigated and allowed to grow, while the other is being eaten down. Pigs also do well when being depastured on lucerne, a ration rich in protein like lucerne being necessary for young pigs while they are still growing and building up a strong framework of bone and muscle, while brood sows fed on it give excellent results.

For the first and even second year, lucerne should not be grazed off, nor in the first year should it be allowed to flower, as this tends to weaken the plants. If a dry spell succeeds immediately after the hay has been cut, it is a great advantage to cultivate between the rows with a disc cultivator, and then harrow smooth with an ordinary harrow. For hay it should be cut when just coming into blossom, as at this time it is at its highest feeding value. If cut during dry weather, it should be sufficiently dry after one day to be collected into cocks about 6 to 8 feet high, and 10 to 12 feet across, where it should be left for a few days to sweat and cool again. After this it may be stacked, and should be handled as little as possible, as the leaves which contain the chief

feeding value of the plant soon become dry and brittle, and then fall off and are lost in the form of small particles of dust.

One of the chief recommendations of lucerne is its great value as a fodder during seasons of drought. In ordinary seasons, stacks of veld hay and ensilage can be made for carrying the stock through the dry winter months, but these are generally only suitable for use within a few months of cutting, and it is doubtful if they would be found of much value as a feed if kept for a longer period than twelve months. On the other hand, a stack of lucerne hay has been known to open up splendidly after as long as twenty years' exposure to all sorts of weather. During seasons of plenty all the lucerne grown can be saved as hay, and the stock fed on the natural grasses. Then when the lean years come, there will be a reserve of good, sweet fodder, full of body, which can with reasonable certainty be relied upon to be almost as good as on the day it was made, and as such will materially help to tide over the time of scarceness. The great difficulty usually experienced in preserving hay is the danger from fire, also the damage done by mice. This latter difficulty, however, does not concern lucerne hay, as there are no seeds in it, and if the stack is made in the middle of the lucerne paddock, there is much less risk of losing it by fire, owing to the plants being either green or bare after the last cutting, and providing in either case no fuel for the grass fire.

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### **Ringling Pigs.**

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At the time the pigs are weaned, cut off completely with a sharp knife the turned up cartilage at the end of the nose, and your pig is unable to root for the remainder of his days.

The method is as follows:—

Have the pig held towards the operator, who with a pair of pliers seizes the cartilage, and draws it out as far as possible. He then takes a sharp knife and cuts it off completely. Put a bit of wool on to stop the bleeding, which, however, never lasts long, and the job is done. This method is now practised in Queensland, where large



numbers of pigs are raised in lucerne paddocks for the markets. These pigs are turned for a few hours daily into the lucerne, which they graze, and of course if they were able to root they would speedily ruin any growing crop. They get nothing but the lucerne, and what they pick up in the adjoining swamp paddocks until about three months old, when they are brought to a weight of about 100 to 120 lbs., and the requisite hardness of flesh by the addition for a few weeks of a little maize. They are sold at about four months. The Queensland buyers will not take pigs over 150 lbs. weight, and the Berkshire pig is the favourite.—*Farmer's Advocate*.

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### **Agricultural Credit in France.**

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The co-operative systems of agricultural credit which have been so markedly successful in Germany and some other European countries are more than usually advantageous to the small than to the large farmer, though where the operations of societies are on a sufficient scale even substantial sums of money can be borrowed on favourable terms. In general, however, it is the farmer in a small way whose resources are limited, and who is farming on an insufficient capital, to whom a temporary loan for the purchase of cattle, fertilisers or seeds may be of invaluable assistance. It frequently happens that an immediate want of money necessitates the sale of crops at unfavourable prices, or of stock in an unfinished condition, whereas a loan easily obtained would enable the cultivator to postpone the sale till a more suitable occasion.

Though essentially a country of small holders, it was not until recent years that agricultural banks began to be introduced into France, and, according to the report of the Minister of Agriculture, there exists in many districts a reluctance to adopt any system of credit. Attempts to establish a bank are often met with the observation: "There are only two classes of farmers in our district, the well-to-do, who would never borrow, and the needy, who will never pay." When a society is formed, however, the better off find it both profitable and convenient to have recourse to a co-operative bank, while among the other class, the report observes that those who

are unable to pay their debts are much more rare than might be supposed. The Ministry of Agriculture give several examples of the advantages accruing from the existence of a co-operative bank, of which the following may, perhaps, be quoted: "A farmer had to pay a sum of £60 in November, 1902, and he had for sale 500 bushels of wheat, which was then very low in price. By applying to the local co-operative institution, he received an advance repayable in three months. He sold his wheat in December when it had risen about 3d. per bushel, thus receiving about £6 more than would have been the case in October. The bank charge was 14s., so that he made a net gain of about £5.

The earliest attempt at the establishment of a co-operative credit bank was made in 1884, when a society was formed at Poligny with a capital of £800, of which one half was paid up. Notwithstanding its small capital, this society was very successful, but its example was followed in only a very few instances. In 1893, rural banks (*caisses rurales*) on the Raiffeisen system began to be introduced, and, in 1901 there were 543 of these associations federated in a central society (*union des caisses rurales*). Based on the principle of the unlimited liability of the members for the debts of the society, it is found that bankers will grant advances to societies of this kind without any guarantee, so that no capital is required. The safety of the money lent to members is ensured by confining each society within very small limits, usually a parish, where the circumstances and character of the members are easily known. Particulars were not available for the whole of the above societies, but it appears 345 societies had a membership of 10,682, or about 31 persons each, and the loans in 1901 numbered 4,319, of a value of about £100,000, that is, each society granted about twelve loans in the course of the year of about £24 each.

Another form of society, known as agricultural banks (*caisses agricoles*), exists, based on the unlimited liability of members, but with a variable capital, each member subscribing for one share, which may be paid by monthly instalments. These societies are combined in the "Centre federatif du credit populaire," which, in 1902, embraced 340 societies, with a membership of 11,326, and a capital of £86,000. In order to encourage agri-

cultural credit, a law was passed in March, 1899, which provides for advances from State funds, free of interest, to direct or regional banks (*caisses regionales*). These banks are unions or federations of local banks, and they devote themselves exclusively to making advances to their affiliated banks, their capital being derived from the State grants and from shares subscribed by the local banks. The total sum available for this purpose was £1,600,000, with an annual addition of not less than £80,000. The advances are now regulated by a committee, according to a decree dated 11th April, 1905.

As a result of this law there existed at the end of 1903, 41 district banks to which the State had advanced about £350,000, and the paid up capital of which was £123,000. The local co-operative banks affiliated to them numbered 616, with a paid up capital of about £59,000. By the beginning of 1905 the advances by the State had advanced to £644,000. The growth of these banks during the three years will be seen from the following table:—

| Year.       | District<br>Banks. | Affiliated<br>No. | Local Banks.<br>Members. | Loans<br>Granted. |
|-------------|--------------------|-------------------|--------------------------|-------------------|
| 1901 ... .. | 21                 | 300               | 7,998                    | 217,000           |
| 1902 ... .. | 37                 | 456               | 22,467                   | 572,000           |
| 1903 ... .. | 41                 | 616               | 28,204                   | 900,000           |

There is considerable variation in the constitution of these local societies, very few restrictions being made by law on the form a local society must take, but the system favoured by the Department of Agriculture is based, not on the Raiffeisen principle of unlimited liability, but on co-operation with limited liability, the subscriptions of persons interested, together with the assistance afforded by the State, enabling loans to be made by the district bank either directly out of capital, or by re-discounting bills through the Bank of France. The following is a summary of the scheme recommended by the Department.

The members of a local co-operative bank must be drawn from the members of an agricultural association, but the number required for its foundation need not exceed seven. It is not, indeed, desired that these local banks should embrace a large number of members, as it



is important that the character and financial condition of the members should be well known. They, therefore, usually confine their operations to one parish, but are affiliated to a district bank, which may include the whole of a department. Each of the members must subscribe for one share, varying from 16s. to 32s., but only one-fourth need be paid up; this bears interest at a rate fixed annually. The liability of the members is limited to the amount of their shares, and a reserve fund is formed by devoting to that purpose three-fourths of the annual profit. In making application for a loan a member must describe the purpose to which it is to be applied, and state the security offered; if the committee grants the loan, the borrower signs a bill, which is forwarded to the district bank for discounting, by whom the money is transmitted to the local bank. Loans can thus be obtained in two or three days. Bills are made for three or six months, renewable after payment of an instalment. If the borrower is well known and of good standing, his signature alone may be accepted; otherwise, or in the case of considerable amounts, security, personal or in stock, is required. A control over the loans is also exercised by the district bank, which keeps itself informed as to the standing of the members of its local banks; when necessary, it may ask for special guarantees. According to another system, the local banks keep a small sum in hand in order to grant loans without delay, and, when necessary, discounts its bills at the district bank. The total sum thus kept in hand by all the local banks affiliated to one district bank may amount to a considerable sum, and as it is not constantly used, part remains unproductive. This method is not recommended, more especially as it is desirable that the organisers of small local banks should not be under the necessity of keeping complicated accounts. There are also other systems of establishing a local bank, *e.g.*, mixed liability, the members being liable for two, three or four times their subscription, or, like the older banks, that of unlimited liability. The local bank devotes an important part of its resources to taking shares in a district bank: indeed, commonly, the whole amount subscribed by members is used in this way. The capital of a district bank, however, need not be very large; for instance, if it amounted

to £2,000, that sum would enable it to obtain at the commencement an advance from the State of £4,000, which might afterwards be increased to £8,000, as the law permits the State to advance four times the paid up capital. A portion of this sum would be devoted to the purchase of securities, to be deposited with the Bank of France, and form a guarantee fund, the remainder of the capital being placed in a current account, and the bills for loans granted retained as far as possible, but re-discounted when necessary.

As an alternative, the district bank may invest practically the whole of its capital in securities, and obtains advances by immediately re-discounting bills at the Bank of France. The charge made by the district bank for advances or for discounting bills varies from 1 to 4 per per cent. Attention is drawn in the above-mentioned report to the inadvisability of granting loans at a rate below the ordinary bank charge. The advances made by the State are intended merely to facilitate the establishment of co-operative banks, and although, owing to these advances being free of interest, the banks are able to lend money at a very low rate, it is pointed out that they are misleading agriculturists as to the rate they may reasonably expect to borrow at, and that the banks are unable profitably to expand their operations, as they can only borrow at a higher rate than they are charging to their members. The Department, therefore, urges these co-operative banks to place their business on a sound commercial footing by only discounting bills at a rate not less than charged by the Bank of France, and to endeavour to make a profit on their transactions which will enable them to place an annually increased sum in reserve.—*The New Zealand Farmer, Stock and Station Journal.*

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## **Tobacco Plant Beds.**

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Half of the failures of tobacco planters have their source in the plant beds. A grower may succeed with carelessly made beds for a season or two, but sooner or later he will find himself without plants to set.

The beds on the estate of the Rhodesian Cotton Company are of the type recommended by this Department. The sides are of sheet iron, and the top is covered with butter muslin stretched on wooden frames. These beds are insect-proof, and with proper attention given to hardening off, will supply plants with which there need be but slight loss.

This is a matter to which we will again refer before the next tobacco season.



Tobacco Beds

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## Importation of Stock.

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*Bulls.*—The Department recently imported 7 Shorthorns, 3 Africanders, 2 Devons, and 1 Ayrshire, all of which were sold, and realised good prices. At the auction held at Salisbury on 17th November, bidding was keen; one Shorthorn, a particularly nice looking animal, going for £65. The others—Shorthorns and Devons—



averaged £45 each: Four of these were secured by Umtali buyers. The success of this sale is very encouraging, and the Department is arranging to get up a further lot shortly. Mr. Ross Townsend, who is spending his holiday down in the Eastern Province of the



Persian Ram. Imported by the Agricultural Department.

Cape Colony, is selecting a number of Shorthorns, Frieslands, and Devons from the well-known herds of Messrs. Southey, Trollip, Wienand, and King. Applicants for these classes of bulls should communicate with the Agricultural Department.

*Persian Rams.*—A splendid looking lot, consisting of 25 pure-bred Persians, arrived in excellent condition. These are being sold at Bulawayo for cash at £4 10s. each, and at Salisbury at £5 each. There are still a few on hand.

*Africander Rams for Improvement of Native Stock.*—Thirty-one of these were got up from Cradock for sale to natives in Matabeleland, who are very keen on them.



Three-quarter bred Persian Merino Ewes. Imported by the Agricultural Department.

*Persian-Merino Ewes.*—365 were imported, and nearly all have been distributed. A limited number are still on hand. Price at Salisbury, 36s. 6d. each. Terms: One-third cash, one-third six months and one-third twelve months, plus interest at the rate of 6 per cent. per annum on instalments, if paid when due.

Mr. Townsend is arranging to send up 500 three-quarter-bred Persian-Merinos of 2 and 4-teeth next April. These we hope to get at a slightly reduced price.

*Persian-Africander Ewes.*—260 imported, and all sold.

## Profitable Poultry.



Fig. I. Trap Nest.

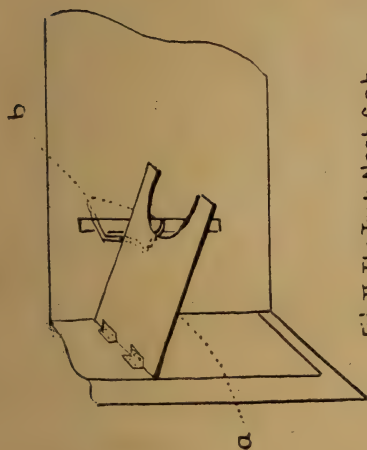


Fig. II. The Trap Nest Set.

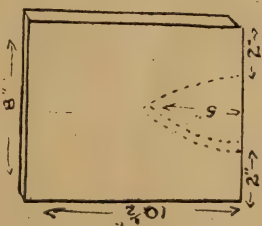


Fig. III. The Door.

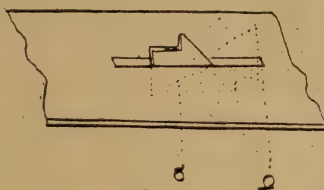


Fig. IV. The Catch in position.

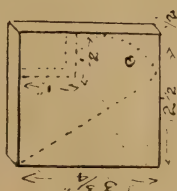


Fig. V. The Catch.

In the article on Poultry in the last Journal the use of the trap nest was recommended for the purpose of testing the laying capabilities of individual birds, with the object of breeding only from the most prolific layers, and thus building up a profitable laying strain.



Explanations of how to construct, and diagrams of a trap nest are given below, so that anyone anxious to use one, and not having been successful in evolving a good idea, may be able to copy this model.

The door (Fig. 3) is cut out of  $\frac{1}{2}$ -inch board, and measures 8 by  $10\frac{1}{2}$  inches, the V-shaped piece cut out being 5 inches high and 4 inches at the base.

The catch (Fig. 5) is also made out of  $\frac{1}{2}$ -inch board, the length from top to bottom being  $3\frac{3}{4}$  inches, the ledge on which the door rests when the trap is set being 1 inch deep and  $\frac{1}{2}$  inch wide.

The rest of the nest may be made any dimensions to fit the wood in use, provided plenty of room is allowed inside for the hen to turn round.

On entering the nest the hen raises the door (*a*) Fig. I., when the catch immediately drops to the position shown at (*b*) Fig. IV., this prevents the door being opened from the outside.

The hen is removed by lifting the lid (*c*) Fig. I. One trap nest is usually allowed for every three or four hens.

After the fowl has laid, she is released by an attendant, who at once records her egg-laying on a card conveniently placed in the pen.

Each hen in a breeding pen where trap nests are in use must be so marked that it can be easily identified, the most suitable way being by means of a leg band with a number stamped on it, small curtain rings, with a distinct mark on each will answer the purpose if put on while the pullet is still young.

A useful card for recording the number of eggs laid by each hen is made as follows:

Rule a sheet of foolscap into as many columns as there are days in the month, leaving space at the beginning to enter each hen under her distinctive number, and at the end to put the total for the month; then at a glance it can be seen which bird heads the list, and which are the drones.

As eggs are always plentiful and cheap at certain times of the year, some simple, cheap, and satisfactory method of preserving them is apparent to everyone.

Eggs to be stored with success must be perfectly fresh, not having been laid for more than three or four days before being packed in the preservative mixture, and never having been incubated for even a few hours. This

latter point is of imperative importance, since if the embryo of the egg once starts to grow, and then dies, the egg will spoil, no matter how it may be preserved.

To test the freshness of eggs, place them in salt water, made by dissolving nine ounces of salt in a gallon of water; if they sink quickly to the bottom of the liquid they are fresh, the staler they are the more buoyant they become. There are three methods, which after many experiments have been found successful for preserving eggs:

Coating the eggs with vaseline.

Immersing them in saturated lime water.

Immersing them in water glass solution.

The first method is quite satisfactory, if it is not intended to preserve the eggs for any great length of time, the only objection to it being that it is rather a dirty business greasing the eggs.

The lime water solution for preserving eggs is made by dissolving one pound of quick lime, and half a pound of table salt in four gallons of boiled water, stirring thoroughly until the lime is quite slacked, then allow the mixture to settle, and pour off the clear liquid for use as the preservative.

Eggs can be added to this mixture day by day as they are freshly laid until the vessel in which it is kept is full; care must be taken to see that every egg is well covered with the liquid. When full, the vessel should be tightly covered to prevent evaporation, and kept in a cool place.

This solution has been known to keep eggs good for nine months; when they were removed, a deposit of lime had formed round the shell, which had become rather brittle, and the white had become slightly watery, but they were quite as useful from a culinary point of view as new laid eggs. The water glass solution can be made in various strengths. One quart of water glass to fifteen quarts of water has been found most satisfactory, although a weaker solution has kept eggs in good condition for a long period of time. It should also be diluted with boiled water, and stored in a cool place with the vessel well covered to prevent evaporation, otherwise if the liquid has much reduced in volume the lower layer of eggs will be found embedded in a thick white sediment,

and difficulty may be experienced in removing them without breaking.

Stone jars are the best vessels to use for preserving eggs, wooden kegs can be used, but owing to the wood absorbing some of the water, the solution may become too strong; an ordinary paraffin tin will do, but difficulty is usually experienced in making them air tight when full, and the eggs should be put in where it is intended to store the tins, otherwise in moving them about, the eggs at the bottom are liable to get broken.

Do not preserve dirty eggs, but do not wash them before packing, as it may injure their keeping qualities by removing a natural protective coating on the outside of the shells. Eggs from birds that are running without a cockerel keep better than eggs which would naturally be used for hatching.

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### Locusts.

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Locusts seem to have hatched out, grown wings, and to a very large extent disappeared.

That is the conclusion which the lack of post-card reports would indicate.

Voetgangers were responsible for a considerable amount of damage, but the young flying swarms easily outdid them before migrating from the district in which they were hatched, and had passed their wingless existence. Much of the damage done, however, has not proved so serious as at first imagined; mealies not more than three or four inches high have grown up again, after having been eaten bare, and so long as they are not eaten off a second time, the crop will in all probability be not much the worse for this check.

Great difficulty was found in many cases in scaring locusts off growing crops, they seemed to take no notice of any amount of noise; one means was found fairly effective: it consisted of a long rope, to which were attached at intervals, pieces of limbo, or other material that would flutter, being drawn over the land on which the locusts had settled; this was found useful in disturbing them, and when once a few were induced to start flying again, the rest of the swarm soon followed suit.



The materials for the destruction of locusts, first used in this colony last season, have been the means of destroying a considerable number of swarms, that is if the arsenite of soda, distributed over the country, was used to the best advantage. It is to be regretted that more reports were not sent in to the Agricultural Department of swarms sprayed, thus giving some idea of the amount of destruction accomplished, and as a guide for future operations.

Besides the considerable amount of arsenite of soda used, the enormous flocks of locust birds, which made their appearance last season in most parts of the country, must have accounted for a vastly greater number of swarms than those destroyed by human agencies. Legislation for the compulsory destruction of locusts is at present out of the question, but it would be a move in the right direction, to impose a severe penalty upon anyone shooting a locust bird. Their great value is, I think, very generally recognised, but there is always to be found some "sportsman" who cannot resist bagging a specimen or two, however valuable the bird may be alive as a destroyer of insects.

The amount of destruction done by these birds is not exactly known, but their capacity must be enormous, and in this colony, where large tracts of country are practically uninhabited, they probably clear districts, where it is nobody's business to attempt any work of destruction.

In places where the arsenite of soda solution has been in use for some time, no case of poisoning these birds from eating sprayed locusts has been proved. Either they do not eat dead locusts, or else the amount of arsenic they absorb into their system with the dead insects has no bad effect on them. Poultry have been known to gorge themselves on sprayed locusts, and to receive no harm, and it is probably the same with these birds.

The efficiency of the arsenite of soda and sugar solution is universally acknowledged; from all parts post-cards have come in reporting swarms having been sprayed with deadly results. The one risk with this solution is its poisonous nature. If, however, farmers realise this, and are very careful in mixing it in the proper proportions, this risk is reduced to a minimum.

The proper proportions are: One pound of arsenite of soda, and eight to sixteen gallons of water; the sugar

is added to make the mixture more attractive to the locusts; the weaker solution is for use on newly-hatched voetgangers, the stronger when nearly developing wings. With this strength there is very little risk of poisoning stock, although care should be taken to keep stock from grazing where the solution has been used, till rains have fallen and washed the arsenic into the ground, or the vegetation has shrivelled up and been burnt off. The risk occurs where people are too impatient and want to see the locusts die within an hour or less of being sprayed, and make the solution four or five times too strong, then if by chance stock should happen to eat where this concentrated mixture has been sprayed, ill effects will very probably occur. Locusts sprayed with the proper solution will die in about twenty-four to thirty-six hours, and will not travel far after having received a dose of the mixture; heavy spraying is not necessary, as a very small portion coming in contact with the insect has a fatal effect, besides the amount it will absorb in drinking as much sugar as possible.

The work of destruction is to be carried on next season among all the South African Colonies, under a co-operative system. A Central Bureau of Information has been organised to deal with reports from all the colonies where locusts are collecting in large swarms. The headquarters of this bureau are at Pretoria, this being considered a suitable centre to which all the different colonies can send particulars with regard to locusts without delay.

The Bureau is not organised to assist in the work of locust destruction, although it will probably issue bulletins giving all possible information on this subject; this work is still left to the efforts of each individual colony or state. Its chief object is to collect information with regard to migratory swarms, so that warning may be sent to districts in advance, towards which these swarms are travelling. This is especially necessary when these swarms are travelling towards the borders of the colony, so that the authorities of the invaded colony may have due warning of a probable incursion over their border from a neighbouring state.

It has constantly been pointed out that without co-operation between the Government and farmers, and between the farmers themselves, the work of locust de-

struction can scarcely be expected to succeed, and it is felt among the Governments of the South African Colonies that unless some co-operation is established among them, and each one knows something of what is being done by his neighbour, there can be no thoroughly organised system of locust destruction.

The chief duty of the Central Bureau, to which all reports of swarms will be forwarded by the locust officer, or department in charge of locust work, in each colony, will be to issue, monthly, or if necessary more often, maps showing in which districts locusts are plentiful, the direction in which they are travelling, and all other useful data which will be of service in organising the campaign. For instance, in Rhodesia due warning will be sent us of swarms migrating in our direction from Portuguese territory, or from the Bechuanaland Protectorate, and prompt measures can at once be taken to prepare for their arrival, by storing in the district a good stock of spraying materials, and also by warning farmers over whose land they are likely to pass, to prepare to fight them with fire and smoke to the best means in their power.

Not only as a means of distributing information will this Bureau be of great value, but also from a scientific point of view; the result of observations conducted over such a wide area, stretching from Southern Rhodesia to Cape Town, will be invaluable in determining the area from which these periodical swarms of locusts emanate.

The best means so far suggested, for collecting the necessary information, is by the post card system in use last year, but it is not thought advisable that everybody should be asked to report to the Chief Locust Officer. This method tends to cause confusion, owing to the possibility of the same swarm, travelling in a circular direction, being reported several times over, thereby making it difficult to identify the swarm in a given district; it is advisable to appoint one or more responsible authorities, according to the size of the district, to receive reports from farmers and natives in that district, who will forward the reports to the Chief Locust Officer, or to the Agricultural Department, for them to forward to the Central Bureau at Pretoria.

Much thanks is due to the Native Commissioners and others, who last year received and distributed materials



for spraying, and it is hoped that they will again undertake to assist in this work, as in most cases they are centrally situated, and are in touch with all the inhabitants of the district. It is also proposed that they should receive reports and forward them to the Agricultural Department. The police also, who when on patrol are bound to come across many swarms, are also to be requested to assist in the work of supplying information.

The following are a few extracts from the Minutes of the Inter-Colonial Conference, summoned to discuss measures for concerted action in dealing with the locust pest, held in Pretoria, August 20th and 21st, 1906. Present: His Excellency the Earl of Selborne, G.C.M.G.; Dr. Adam Jameson, Transvaal Commissioner of Lands; Mr. F. B. Smith, Transvaal Director of Agriculture; Mr. C. B. Simpson, Transvaal Government Entomologist; Mr. C. P. Lounsbury, Cape Colony Government Entomologist; Mr. C. Fuller, Natal Government Entomologist; Mr. C. McG. Johnston, representing the Orange River Colony; Mr. L. Dumaresq, representing the Orange River Colony; Mr. L. Wroughton, representing Basutoland; the Hon. Joseph Baynes.

His Excellency the Earl of Selborne: Gentlemen,—This year we have again, I believe, throughout South Africa—certainly in the Orange River Colony and in the Transvaal—been visited by the devastating scourge of locusts. I doubt, from what the old inhabitants of the country tell me, if a worse year has ever been known. It has at all events reminded us what a terrible additional anxiety the existence of this scourge is to the agricultural industry of South Africa, and how it may jeopardise the results of the farmer's most careful provision and most assiduous labour at the moment when he expects to reap the results of his long toil and industry. If the locust could be removed from South Africa, the gain to the wealth of the country is almost beyond our calculation. I am told by some people that it is a scourge with which man cannot deal, but I do not believe it, gentlemen. I am perfectly convinced—it may seem a rash thing to say—but I am perfectly convinced from my own little experience of South Africa that it is not beyond the power of man to deal with. It is quite beyond the power of the ordinary man to deal with, or the district, or the Colony. It can be dealt with only by South Africa acting in unison

for the purpose. It is with the view of seeing whether we can accomplish that unity, so far as it is necessary for this purpose, that I have asked you to come together. So far am I from believing that the scourge cannot be dealt with that I believe it can be dealt with in more ways than one. It has been dealt with in isolated cases, and, to a limited extent, with complete success by different experts and in different ways. But in order to deal properly with this scourge, the first thing requisite is adequate information. You may have a complete method of dealing with it, but if suddenly you find your land overspread with the scourge when it is first hatched, and your preparations are not made, you are not able to deal with it. Therefore this conference, which may, I hope, lead to further co-operation, has a limited scope. I have asked you to meet to consider whether you cannot formulate a scheme for collecting and supplying information on this subject, so that every part of South Africa may know beforehand, and well in advance, where the scourge is likely to appear, and so that preparations can be made for dealing with it. We have here all the principal colonies represented—the Cape Colony, Natal, the Orange River Colony, and the Transvaal—and Basutoland is also adequately represented. No representative is present from Bechuanaland, but I think I can answer for it that Bechuanaland will conform, so far as its limited means will enable it to do so, to any scheme on which you may all be agreed. I know that some people may say that Bechuanaland is really the crux of the situation, or the Kalahari, that lies west of Bechuanaland. Well, gentlemen, I regret to think that the Kalahari is a hard nut to crack, but all locusts do not come from the Kalahari, and if we can deal with those that really do emerge within the radius of civilisation, that are hatched in the Colonies, are hatched on farms in actual occupation of white men; if we can deal with these locusts, I am quite sure we have taken a very long step in advance; and if, after we have dealt with them, we should see our way to dealing with the others, I do not think it is absolutely impossible for us to deal with locusts, even in the Kalahari. After all, there are natives who are very anxious to earn money fairly easily, and, although I do not speak with certainty, I am not prepared to say that nothing can be done in the Kalahari until it has been tried and failed.

Therefore, gentlemen, I invite you to this conference on this subject, and, of course, if other aspects of the subject should arise in the course of your deliberations, everything upon which you can agree will be to the good of South Africa and to the advantage of the much tried farmer, who needs all the help the Governments can give him in their individual capacity and collectively in his struggle against the peculiar difficulties of South Africa.

Mr. Simpson: I have had a scheme in operation for some time, and will give you the details. The principal thing is, that by this inter-colonial scheme we can get reports from the whole of South Africa, and we, each of us, know what is happening in our border colonies. Thus we can, I hope, notify our farmers from a week to a month or two in advance of the fact that flying locusts are entering or about to enter the colony. During the last few months we were able to do this in many instances, so that the farmers could be prepared to protect their crops before the locusts arrived. With these things in mind, there is no doubt that an inter-colonial scheme would be fully justified, and that the loss prevented would quite justify any expense to which we may be put. Further, in years to come we might be able to map a flight of these locusts across the country so accurately that we could, months and months ahead, forecast the presence of voetgangers. As yet we know very little about the locusts in the Kalahari Desert, and these reports will give us that information—that is, basic information—on which we could do further work.

Mr. Lounsbury: This year we could have told the Transvaal ten days or a month ahead that immense swarms of locusts were moving in their direction, but we could not have told them where they would cross the border, nor in what direction they would move from day to day. I believe myself that the flights of swarms are very largely guided by the winds. In other years the locusts coming from the north-west have taken a more southerly course, and have flown across Cape Colony almost to the sea in the vicinity of Port Elizabeth, and in a different direction, and it would be extremely difficult, I imagine, without having the experience of years to guide us, to say in what direction the flight would be taken. We have almost no data regarding winds in



South Africa, and what little data we have is really regarding surface winds. We have a dual system of collecting information at the Cape. Instead of sending out postcards promiscuously, we have adopted the plan of securing the assistance of an enlightened and progressive farmer in each field-cornetcy, and getting him to mail us a postcard report when anything critical occurs at his place. If a swarm passes, he mails us a card. If the eggs are being hatched we get a card, and we have cards when the voetgangers hatch and when the winged insects take flight. That will tell us pretty well where the locusts are, and what they are doing at any particular time. Apart from that, we have arranged with the police over the major part of the colony to send us information. It is the custom in the Cape Police for a police patrol to call at every farm at least once a month, and these police patrols are constantly on the move. They know pretty well what is going on as concerns locusts. . . . I think there is a great advantage in having the data collected by local authorities. A good deal depends upon getting the goodwill of the individual or police reporting.

Mr. Fuller: I think if we are going to do anything in regard to the locust pest in South Africa generally, it will be necessary to have such a scheme.

Mr. Smith (after a few remarks on the influence of the winds upon the direction of the flight of locusts): But, of course, badly as we want to know about the swarms of flying locusts, still more do we want information as to where the locusts are laying, and where the voetgangers are likely to appear, because, after all that is the vital point; and if the intelligence bureau can supply us with this knowledge, then I think it will do a very great deal.

While discussing the various means of destroying locusts, Mr. Simpson contributed the following: I would say that our experience has been that the arsenic solution is the only practical thing to use.

One man in a certain district of the Transvaal was very active in spreading reports one season that we had killed 15,000 locust birds, and were killing thousands every day by the locust spray. Locust birds are to be encouraged, so we investigated this question most thoroughly. Every S.A.C. trooper, every native chief, police boy and locust officer was asked to search for locust

birds. We found one, and that had been eaten by a jackal. We have many instances where men have seen these birds eat their fill of poisoned locusts, and they have traced them to their roosting places, and found that none of them died. In the Rustenberg district last season the locust officer offered half-a-crown for dead fowls killed by locust poisoning. No one claimed the reward, but strange to say a Dutch woman came and asked for dead locusts to feed her fowls. In order to get a toxic dose, fowls must eat about 11 lbs. of locusts, which is quite impossible. So that we can lay it down that as far as locust birds and fowls are concerned, there is absolutely no danger to them on account of spraying with arsenic. The question of the possible poisoning of stock is a much more difficult question, but we have succeeded in finding out some valuable facts. The toxic dose for an ox ranges from  $\frac{1}{2}$  oz. to 1 oz. of arsenic, depending upon the size of the animal. The solutions we use are one pound of arsenic to eight to sixteen gallons of water, sprayed lightly. A calf must eat 36 lbs. of grass newly sprayed at the rate of one pound of arsenic to eight gallons of water before it will die. With a full-grown ox the quantity is 72 lbs. Animals will die if put into a camp that has been half sprayed. We put in four. Two died of arsenic poisoning; one died of an abscess in the liver, and the fourth is alive and well. The camp was 60 by 60 feet, and half of it was sprayed. Rain will wash off the poison, as after 1.36 inches of rain, it takes 260 lbs. of grass to kill an animal. These are the experimental facts regarding the poisoning of stock. Some animals have been poisoned by leaving buckets of the solution lying round, out of which cattle have drunk. Another case of stock-poisoning was where the concentrated solution was spilled on the ground, and no precautions were taken to cover it. Cattle licked it up, and some have died. Further, it is no trouble whatever for a farmer to keep the cattle away from recently sprayed ground. To sum up the question of the liability of the poisoning of cattle by locust sprays, I would say that both our experiments and experience of the past two years show us conclusively that if any man using the spray as we recommend it, together with the care anyone would ordinarily use in handling a dangerous poison, there is no danger of poisoning stock.

At the conclusion of the Conference, the following resolutions were formally put and agreed to:—

I. Proposed by Mr. Smith, seconded by Mr. Lounsbury:

“That this Conference recommend the immediate establishment of a Central Bureau, to be maintained for not less than five years, for the collection, tabulation, and distribution of reports of locust swarms through the whole of British South Africa.”

II. Proposed by Mr. Smith, seconded by Mr. Simpson:

“It is recommended that the Governments of Portuguese East Africa and German West Africa be invited to co-operate.”

III. Proposed by Mr. Smith, seconded by Mr. Simpson:

“It is recommended that the Bureau be under the direction of a committee comprised of one representative from each contributing Colony or Territory.”

IV. Proposed by Mr. Smith, seconded by Mr. Lounsbury:

“It is recommended that the Bureau be located in Pretoria, and that the funds contributed for its upkeep be administered by the Director of Agriculture of the Transvaal.”

V. Proposed by Mr. Smith, seconded by Mr. Dumaresq:

“That the Committee shall hold an annual meeting at a time and place to be agreed upon by a majority of the members. An extraordinary meeting of the Committee may be held at any time at the request of two or more of the contributing Colonies or Territories. Three members shall constitute a quorum at any meeting.”

VI. Proposed by Mr. Smith, seconded by Mr. Lounsbury:

“It is recommended that the cost of the Bureau, which shall not exceed £500 during the first year, be borne by each Colony or Territory, in accordance with the recognised scale.”



VII. Proposed by Mr. Smith, seconded by Mr. Fuller:

"It is recommended that each Colony make arrangements for collecting information regarding the position and movements of swarms of locusts within its borders, and that it transmit the same with all possible dispatch to the Bureau, together with any details that may be available."

VIII. Proposed by Mr. Smith, seconded by Mr. Dumaresq:

"It is recommended that the Bureau receive and tabulate the information so forwarded, and from time to time, as may be deemed necessary, issue maps and memoranda to each Colony or Territory concerned, showing the latest position and probable movements of locusts, and further furnish, when possible, any special information desired by any Colony or Territory."

IX. Proposed by Mr. Dumaresq, seconded by Mr. Smith:

"That this Conference expresses itself in favour of locust legislation on the lines adopted in Natal."

X. Proposed by Mr. Dumaresq, seconded by Mr. Simpson:

"That in the opinion of this conference, the chief measure of control is in the destruction of locusts in the wingless, or voetganger stage, and this Conference urges upon the Governments of the various Colonies and Territories, to take steps to make the ease and low cost of destroying locusts by the sweetened arsenical solution universally known to farmers in locust infected regions. Further, this Conference wishes to add that from the experience of the members composing it, despite the high toxic properties of the solution, very little danger has resulted, or is likely to result, from the general adoption of this treatment to poultry, stock, or man."

XI. Proposed by Mr. Dumaresq, seconded by Mr. Smith:

“That this Conference is strongly of opinion that each of the South African Colonies or Territories should take measures to, as far as possible, ensure the prompt destruction of all voet-gangers hatched out within its borders.”

XII. Proposed by Mr. Dumaresq, seconded by Mr. Simpson:

“That in the opinion of this Conference, it is necessary that, in order to secure the general destruction of locusts, qualified officers should be employed under each Government and controlled by the Department of Agriculture of such Government, to demonstrate to the farmers in every infected area the measures recommended.”

XIII. Proposed by Mr. Dumaresq, seconded by Mr. Smith:

“That owing to the immense loss to the Transvaal and Orange River Colony caused by the ravages of locusts hatched in Griqualand West and Bechuanaland, this Conference strongly represents the importance of action on the part of the Governments of Cape Colony with the pest in those parts of its area.”

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## Carbon Bi-Sulphide.

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Owing to there having been made recently some enquiries as to the best means of preventing weevil in mealies, and other foodstuffs and seeds, the following short note on Carbon bi-sulphide may be found useful.

Carbon bi-sulphide is a colourless, volatile liquid, possessing a sweet sickly odour when pure, but the smell of the usual commercial product is particularly objectionable. The fumes are very poisonous to all forms of animal life, but non-injurious to foodstuffs, the germs of

seeds, etc. On this account it is one of the most useful means of preserving stored grain of all kinds, and many varieties of provisions from the ravages of insect pests.

As its vapour is heavier than air, it is very easily applied, a shallow dish containing the liquid, which rapidly evaporates, is placed at the top of the room or vessel in which the grain or other substance to be treated is stored, and the fumes permeate downwards through the mass, killing all insect life with which they come in contact.

It can also be used for preventing or destroying moths in furs and clothes, and for clearing out bugs from houses. It is poisonous to such vermin as moles, rabbits and rats. The best way to apply it to their burrows and runs, is to thoroughly saturate some old rags or some cotton waste with the liquid, put a small quantity in two or three different places, and close up the holes immediately with earth.

As a white ant destructor, it has been found very efficient; a hole is made with a bar in the centre of the ant hill, one or two ounces of Carbon bi-sulphide poured in through an iron pipe, and the hole immediately closed.

A special apparatus has been made for applying it to the roots of vines suffering from *Phylloxera*.

A small quantity can be inhaled by human beings without injurious effects, and in the open air there is very little danger of poisoning.

Owing to the vapour being very inflammable, and when mixed with air explosive, great care must be taken when using it not to allow the fumes to come in contact with a naked light, even a lighted pipe or the glowing end of a cigarette is sufficient at times to set them alight.

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## Rhodesian Agricultural and Horticultural Society.

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The Annual Show of the above Society is to be held in Salisbury on 21st and 22nd of June, 1907.

### LIST OF SPECIAL PRIZES, AND BY WHOM PRESENTED.

- L. S. Macarthur.—Silver Cup to the most successful Exhibitor in Sheep Section.  
 S. Meikle.—Silver Cup to most successful Exhibitor in Showyard.  
 J. Edwards.—Silver Cup, Leaping Competition.  
 E. Ross Townsend.—£2 10s., Pure-bred Persian Ram.  
 E. Ross Townsend.—£2 10s., Ram, any other breed.  
 Fred E. Weinhold.—£3 3s., Most perfect Bull, Heavy breed.  
 R. F. S. Fischer.—£5 5s.,



- J. A. Edmonds.—£3 3s., Best Angoni Bull and Cow.  
 G. V. van der Byl.—£2 2s., Best 100 lbs. Manna Hay.  
 G. H. Williams and Co.—£2 2s., Best Collection of Vegetables grown from seed supplied by them, confined to amateurs.  
 G. H. Williams and Co.—£2 2s., Best Collection of Vegetables grown from seed supplied by them, confined to market gardeners.  
 Edwards and Co.—Gold Medal for Cigar Wrapper.  
 Wightman and Co.—£5 5s., Best 100 lbs. Beans, bag of Oats, bale of Forage, bag of Up-to-date Potatoes, Bread made from Rhodesian-grown Wheat.  
 Fred Harris.—Two special prizes for Poultry.  
 Pretorius and Co.—£5 5s. to most successful Exhibitor of Cereals.  
 G. M. Odium.—Gold Medal to Exhibitor securing highest number of points in Mealie Class 7-15.  
 R. B. Woods.—£2 2s. for best Collection of Produce grown by any one farmer, must be three exhibits.  
 W. H. Williamson.—Silver Cup, best Rhodesian-bred Heifer.  
 B.T.A.—£3 3s. for best bag of Potatoes on Showyard.  
 B.T.A.—£5 prize to most successful Exhibitor in Pig Section.  
 C. F. Browning.—£3 3s. for 10 best bags of Mealies, scaling 203 lbs. per sack.  
 Messrs. McIlwaine and Simpson.—£4 10s. for best 100 lbs. Mealies, to be judged according to Illinois Rules; exhibit must be part of not less than 50 bags.  
 £2 2s. prize for best Colt or Filly, two years and under.  
 Special prize given by Messrs. Fitt Bros. and McDonald.

FOOTNOTE.—Entry forms can be obtained from W. H. Williamson, Esq., c/o Messrs. Whitfield and Co., Salisbury.

#### SECTION A.—HORSES.

First prize for each Class, £1 10s.

Second prize for each Class, 15s.

Entry fee, 7s. 6d. each Class.

##### Class.

1. Stallion at Stud.
2. Mare, with foal at foot.
3. Colt, bred in Rhodesia, under 3 years and over 12 months.
4. Filly, bred in Rhodesia, under 3 years and over 12 months.
5. Foal, under 12 months.
6. Riding Horse, Stallion, Mare or Gelding.
7. Riding Pony, 14.2 or under, to be exhibited under saddle.
8. Hack, ridden by a Lady.
9. Hack, ridden and owned by *bona fide* farmer.
10. Hack, bred in Rhodesia, Stallion, Mare or Gelding.
11. One-horse Turn-out.
12. Pair-horse Turn-out.
13. Pony Turn-out, Single, 14.2 or under.
14. Driving Competition, Pairs; neatness of turn-out will be considered.
15. Driving Competition, Tandem.
16. Leaping Competition. 1st prize £2, 2nd prize £1; prizes to be awarded on marks awarded on 2 days' jumping.
17. Leaping Competition, confined to members of the B.S.A.P., S.R.V. and S.R.C. 1st prize £2, 2nd prize £1; conditions, same as Class 16.
18. Polo Pony, not over 14.2 hands, to be played on Showground. Note.—Ball will be provided.

#### SECTION B.—MULES.

First prize for each Class, £1 1s.

Second prize for each Class, 15s.

Entry fee, 7s. 6d. each Class.

##### Class.

1. One Mule Turn-out.
2. Pair of Mules in Cart or Carriage.
3. Span of 6 Mules in Cape Cart.
4. Jennet, Rhodesian bred.
5. Riding Mule, to be shown under saddle.

## SECTION C.—DONKEYS.

Entry fee, 5s. each Class.

| Class.  | 1st prize. | 2nd prize. |
|---|------------|------------|
| 1. Jackass, for breeding purposes .. .. .             | £1 0 0     | £0 10 0    |
| 2. Jenny, for breeding purposes, with foal at foot .. | 1 0 0      | 0 10 0     |
| 3. Single Donkey Turn-out, to be driven in Showyard   | 1 0 0      | 0 10 0     |
| 4. Riding Donkey, to be exhibited under saddle ..     | 1 0 0      | 0 10 0     |
| 5. Donkey Race, to be ridden once round the ring ..   | 1 0 0      | 0 10 0     |

## SECTION D.—SHEEP.

First prize for each Class, £1.

Second prize for each Class, 10s.

Third prize for each Class, 5s.

Entry fee, 2s. 6d. each Class.

| Class.   |
|--|
| 1. Pure-bred Merino Ram.   |
| 2. Pure-bred Merino Ewe.   |
| 3. Pure-bred Persian Ram.  |
| 4. Pure-bred or graded Persian Ram, bred in Rhodesia.                          |
| 5. Pure-bred Persian Ewe.  |
| 6. Pure-bred or graded Persian Ewe, bred in Rhodesia.                          |
| 7. Pure-bred Africander Ram.   |
| 8. Pure-bred Africander Ewe.   |
| 9. Ram, any breed.   |
| 10. Ewe, any breed.  |
| 11. Cross-bred Ewe, Rhodesian bred, cross to be declared, 18 months and under. |
| 12. Yearling Ram, woolled sheep.   |
| 13. Yearling Ewe, woolled sheep.   |
| 14. Pen of 3 Wethers, any breed, fit for slaughter.                            |
| 15. Pen of 3 Wethers, any breed, fit for slaughter, confined to farmers.       |
| 16. Pen of 3 Wethers, fat tailed, fit for slaughter.                           |
| 17. Pen of 3 Wethers, fat tailed, fit for slaughter, confined to farmers.      |
| 18. Yearling Ewe, any breed, cross bred.                                       |
| 19. Pen of 6 Cross-bred Lambs, 2 teeth or under, cross to be declared.         |
| 20. Pen of 6 Cross-bred Ewe Lambs, 2 teeth or under, cross to be declared.     |

## SECTION G.—POULTRY.

First prize for each Class, 10s.

Second prize for each Class, 5s.

Entry fee for each Class.

| Class.   |
|--|
| 1. Brahma Cock ; do. Hen ; do. Cockerel ; do. Pullet.  |
| 2. Black Spanish Cock ; do. Hen ; do. Cockerel ; do. Pullet.   |
| 3. Andalusian Cock ; do. Hen ; do. Cockerel ; do. Pullet.  |
| 4. Game Cock ; do. Hen.  |
| 5. Cochín Cock ; do. Hen.  |
| 6. Plymouth Rock Cock ; do. Hen.   |
| 7. Black Orpington Cock ; do. Hen ; do. Cockerel ; do. Pullet.   |
| 8. Buff Orpington Cock ; do. Hen ; do. Cockerel ; do. Pullet.  |
| 9. Dark Dorking Cock ; do. Hen. Silver Dorking Cock ; do. Hen.   |
| 10. White Leghorn Cock ; do. Hen ; do. Cockerel ; do. Pullet. Buff Leghorn Cock ; do. Hen. Brown Leghorn Cock ; do. Hen.   |
| 11. Black Minorca Cock ; do. Hen ; do. Cockerel ; do. Pullet.  |
| 12. Ancona Cock ; do. Hen.   |
| 13. White Wyandotte Cock ; do. Hen ; do. Cockerel ; do. Pullet. Silver Wyandotte Cock ; do. Hen ; do. Cockerel ; do. Pullet. Partridge Wyandotte Cock ; do. Hen ; do. Cockerel ; do. Pullet. |
| 14. White Minorca Cock ; do. Hen.  |
| 15. Pen of Colonial Fowls, consisting of 2 hens and cock.  |
| 16. Hen with chickens, not less than 8.  |

## SUB-SECTION B.

Class.

1. Aylesbury Duck and Drake.
2. Muscovy Duck and Drake.
3. Duck and Drake for table use.
4. Duck and Drake, any other breed.

## SUB-SECTION C.

Class.

1. Goose and Gander.

## SUB-SECTION D.

Class.

1. Cobbler and Hen.
2. Gobbler and Hen, American bronze.

## SECTION I.—PRODUCE.

## SUB-SECTION A.

Entry fee, 2s. 6d. each Class.

£2 2s., R. B. Wood, for best Collection of Produce grown by any one Farmer, Limited to 3 entries,

| Class.  | 1st prize. | 2nd prize. |
|---|------------|------------|
| 1. 10 lbs. Salt Butter, to be handed to Secretary not less than 3 months before date of Show .. | £2 0 0     | £1 0 0     |
| 2. 2 lbs. Fresh Butter .. .. .  | 0 10 0     | 0 5 0      |
| 2½. 2 lbs. Fresh Butter, to be handed to Secretary 7 days before date of Show .. .. .           | 0 10 0     | 0 5 0      |
| 3. Assortment of Jams, not less than 3 kinds, in 2 lb. jars .. .. .                             | 0 10 0     | 0 5 0      |
| 4. Assortment of Jellies, not less than 3 kinds ..  | 0 10 0     | 0 5 0      |
| 5. Assortment of Marmalade, not less than 3 kinds, in 2 lb. jars .. .. .                        | 0 10 0     | 0 5 0      |
| 6. 2 lbs. Strained Honey .. .. .  | 0 5 0      | 0 2 6      |
| 7. Three sections Comb Honey, bottled .. ..   | 0 5 0      | 0 2 6      |
| 8. Assortment of Bottled Fruits .. .. .   | 0 10 0     | 0 5 0      |
| 8½. Assortment of Bottled Preserves .. .. .   | 0 10 0     | 0 5 0      |
| 9. 5 lbs. Dried Apricots .. .. .  | 0 10 0     | 0 5 0      |
| 10. 5 lbs. Dried Peaches .. .. .  | 0 10 0     | 0 5 0      |
| 11. Assortment of Chutney, 3 varieties .. ..  | 0 10 0     | 0 5 0      |
| 12. Assortment of Pickles, 3 varieties .. ..  | 0 10 0     | 0 5 0      |
| 13. Loaf of Home-made Bread, white, not to weigh more than 2 lbs. .. .. .                       | 0 5 0      | 0 2 6      |
| 14. Loaf of Home-made Bread, brown, not to weigh more than 2 lbs. .. .. .                       | 0 5 0      | 0 2 6      |
| 15. Dozen Hen's Eggs, to be weighed .. .. .   | 0 5 0      | 0 2 6      |
| 16. Dozen Duck Eggs, to be weighed .. .. .  | 0 5 0      | 0 2 6      |
| 17. Dozen Muscovy Duck Eggs, to be weighed ..   | 0 5 0      | 0 2 6      |
| 18. Dozen Goose Eggs, to be weighed .. .. .   | 0 5 0      | 0 2 6      |
| 19. Dozen Turkey Eggs, to be weighed .. ..  | 0 5 0      | 0 2 6      |
| 20. Ham, grown and cured in Rhodesia .. ..  | 0 10 0     | 0 5 0      |
| 21. Side of Bacon, grown and cured in Rhodesia ..   | 0 10 0     | 0 5 0      |

## SUB-SECTION B.

Entry fee each Class, 2s. 6d.

| Class.                                     | 1st prize. | 2nd prize. |
|--|------------|------------|
| 1. Bag of Wheat, 100 lbs. .. .. .          | £1 10 0    | £0 15 0    |
| 2. Bag of Oats, 100 lbs. .. .. .           | 1 0 0      | 0 10 0     |
| 3. Bag of Barley, 100 lbs. .. .. .         | 1 0 0      | 0 10 0     |
| 4. Bag of Bread Mealies, 100 lbs. .. .. .  | 1 0 0      | 0 10 0     |
| 5. Bag of White Mealies, 100 lbs. .. .. .  | 1 0 0      | 0 10 0     |
| 6. Bag of Yellow Mealies, 100 lbs. .. .. . | 1 0 0      | 0 10 0     |
| 7. 10 cobs Hickory King Mealies .. .. .    | 1 0 0      | 0 10 0     |
| 8. 10 cobs Silver King Mealies .. .. .     | 1 0 0      | 0 10 0     |
| 9. 10 cobs Horse tooth Mealies .. .. .     | 1 0 0      | 0 10 0     |
| 10. 10 cobs Boone County Mealies .. .. .   | 1 0 0      | 0 10 0     |
| 11. 10 cobs Yellow Dent Mealies .. .. .    | 1 0 0      | 0 10 0     |



| Class.  | 1st prize. | 2nd prize. |
|---|------------|------------|
| 12. 10 cobs Golden Eagle Mealies .. .. .                | £1 0 0     | £0 10 0    |
| 13. 10 cobs Golden Leaming Mealies .. .. .              | 1 0 0      | 0 10 0     |
| 14. 10 cobs Funk's 90 days .. .. .                      | 1 0 0      | 0 10 0     |
| 15. 10 cobs Any other declared variety or cross .. .. . | 1 0 0      | 0 10 0     |

Classes 8, 9, 10, 11, 12, 13 and 14 to be judged by the score card according to the rules of the Illinois Maize Breeders' Association; to be first judged on the cob alignment of rows, uniformity of exhibit, the covering of the butts and tips, and the shape of the kernel. The three best exhibits to be shelled, and the decision to be based upon the percentage of grain to the total weight of the ear.

| Class.   | 1st prize. | 2nd prize. |
|--|------------|------------|
| 16. Bag of Rye, 100 lbs. .. .. .               | £0 10 0    | £0 5 0     |
| 17. Bag of Buck Wheat, 100 lbs. .. .. .        | 0 10 0     | 0 5 0      |
| 18. Bag of Beans, 50 lbs. .. .. .              | 0 10 0     | 0 5 0      |
| 19. Bag of Peas, 50 lbs., Table .. .. .        | 0 10 0     | 0 5 0      |
| 20. Bag of Peas, 50 lbs., Field .. .. .        | 0 10 0     | 0 5 0      |
| 21. Bag of White Kafir Corn, 100 lbs. .. .. .  | 0 10 0     | 0 5 0      |
| 22. Bag of Red Kafir Corn, 100 lbs. .. .. .    | 0 10 0     | 0 5 0      |
| 23. Bag of Manna Seed, 100 lbs. .. .. .        | 0 10 0     | 0 5 0      |
| 24. 10 cobs American Sweet Corn .. .. .        | 0 10 0     | 0 5 0      |
| 25. Bag of Rice, 100 lbs. .. .. .              | 0 10 0     | 0 5 0      |
| 26. 200 lbs. Tanning Bark .. .. .              | 0 10 0     | 0 5 0      |
| 27. 50 lbs. Dried Onions .. .. .               | 0 10 0     | 0 5 0      |
| 28. Bag Monkey Nuts, shelled, 100 lbs. .. .. . | 0 10 0     | 0 5 0      |
| 29. Bag Cow Peas, 100 lbs. .. .. .             | 0 10 0     | 0 5 0      |
| 30. Native Beans, 100 lbs. .. .. .             | 0 10 0     | 0 5 0      |

## SUB-SECTION C.

Entry fee, 2s. 6d. each Class.

| Class.   | 1st prize. | 2nd prize. |
|--|------------|------------|
| 1. 100 lbs. Lucerne Hay .. .. .                              | £0 10 0    | £0 5 0     |
| 2. Truss of Grass Hay .. .. .                                | 0 10 0     | 0 5 0      |
| 3. Truss of Ensilage .. .. .                                 | 0 10 0     | 0 5 0      |
| 4. 100 lbs. Manna Hay, for feeding purposes .. .. .          | 0 10 0     | 0 5 0      |
| 4½. Bundle of Manna Hay, 12 in. in diameter, ripe .. .. .    | 0 10 0     | 0 5 0      |
| 5. Bundle of Cape Oat Hay Forage, untrimmed .. .. .          | 0 10 0     | 0 5 0      |
| 6. Bundle of any other variety of Oat Hay, untrimmed .. .. . | 0 10 0     | 0 5 0      |
| 7. Best bale of Wheat Chaff .. .. .                          | 0 10 0     | 0 5 0      |

## SUB-SECTION D.

| Class.   | 1st prize. | 2nd prize. |
|--|------------|------------|
| 1. Sack of Mealie Meal, open to millers only .. .. .   | £0 10 0    | £0 5 0     |
| 2. Sack Rapoko Meal, open to millers only .. .. .  | 0 10 0     | 0 5 0      |
| 3. Sack Meal milled from Rhodesian-grown wheat .. .. .   | 0 10 0     | 0 5 0      |
| 4. Sack Kafir Corn Meal, White .. .. .   | 0 10 0     | 0 5 0      |
| 5. Sack Kafir Corn Meal, Red .. .. .   | 0 10 0     | 0 5 0      |
| 6. Sack Mealie Meal, Yellow, to be exhibited by grower .. .. .   | 0 10 0     | 0 5 0      |
| 7. Sack Mealie Meal, White, to be exhibited by grower .. .. .  | 0 10 0     | 0 5 0      |
| 8. Sack Mealie Meal, ground by farmer .. .. .  | 0 10 0     | 0 5 0      |
| 9. Sack Bread Mealie Meal .. .. .  | 0 10 0     | 0 5 0      |
| 10. Exhibit of Bread made from wheat grown in Rhodesia, name of grower and miller to be stated .. .. . | 0 10 0     | 0 5 0      |

## SUB-SECTION E.

Entry fee, 2s. 6d. for each Class.

| Class.                                     | 1st prize. | 2nd prize. |
|--|------------|------------|
| 1. Bag of Up-to-Date .. .. .               | £0 10 0    | £0 5 0     |
| 2. Bag of Early Rose .. .. .               | 0 10 0     | 0 5 0      |
| 3. Bag of Magnum Bonum .. .. .             | 0 10 0     | 0 5 0      |
| 4. Bag of Flower Ball .. .. .              | 0 10 0     | 0 5 0      |
| 5. Bag of German Blue .. .. .              | 0 10 0     | 0 5 0      |
| 6. Bag of British Queen .. .. .            | 0 10 0     | 0 5 0      |
| 7. Bag of White Elephant .. .. .           | 0 10 0     | 0 5 0      |
| 8. Bag of Pale Reds .. .. .                | 0 10 0     | 0 5 0      |
| 9. Bag of any other variety, named .. .. . | 0 10 0     | 0 5 0      |

## SUB-SECTION F.

Entry fee, 2s. 6d. each Class.

| Class.  | 1st prize. | 2nd prize. |
|---|------------|------------|
| 1. 30 lbs. Unginned Egyptian Cotton, length of staple, colour, and strength to be considered . . . . .      | £0 10 0    | £0 5 0     |
| 2. 50 lbs. Unginned American Cotton, length of staple, colour, and strength to be considered . . . . .      | 0 10 0     | 0 5 0      |
| 3. Bundle of scutched Flax, length of fibre, colour, strength and separation from wood considered . . . . . | 0 10 0     | 0 5 0      |
| 4. Bundle, not less than 40 lbs., length of fibre, colour, strength and separation from pulp . . . . .      | 0 10 0     | 0 5 0      |
| 5. Bundle not less than 10 lbs., fibre made from sasa-verid or other indigenous plant . . . . .             | 0 10 0     | 0 5 0      |
| 6. Bundle of Ramie Ribbons, not less than 10 lbs. . . . .   | 0 10 0     | 0 5 0      |

## SECTION J.—AGRICULTURAL AND DAIRY IMPLEMENTS, ETC.

Entry fee, 10s. each Class.

| Class.   | 1st prize.    | 2nd prize. |
|--|---------------|------------|
| 1. Best collection of Agricultural Implements, the <i>bona fide</i> property of a farmer . . . . . | £2 10 0       | £1 0 0     |
| 2. Best collection of Agricultural and Dairy Implements and Machinery . . . . .                    | Silver Medal. |            |
| 3. Best collection of Farm and Garden Seeds . . . . .  | Silver Medal. |            |

NOTE.—Space will be provided on Showground for exhibition of Agricultural Implements and Machinery not mentioned above, to be judged and diploma given if considered of sufficient merit.

## SECTION K.—VEGETABLES.

Prizes :—Class 1 : 1st prize, £1 ; 2nd prize, 10s. All other Classes : 1st prize, 5s. ; 2nd prize, 2s. 6d.

Entry fee, 1s. each Class.

| Class.  |
|---|
| 1. Best collection of Vegetables, not more than 5 of each of the larger varieties. Exhibits in other Classes cannot be shown in this Class. |
| 2. Twelve Artichokes.   |
| 3. Bunch of Asparagus.  |
| 4. Six Beetroot.  |
| 5. Collection of Salad on tray not exceeding 18 inches in diameter.   |
| 6. Three Cabbages.  |
| 7. Three Cauliflowers.  |
| 8. Dish of Brussels Sprouts.  |
| 9. Twelve Carrots.  |
| 10. Twelve Turnips.   |
| 11. Twelve Parsnips.  |
| 12. Six sticks of Celery.   |
| 13. Collection of Herbs, on tray not exceeding 18 inches in diameter.   |
| 14. Twelve Kohl Rabi.   |
| 15. Twelve Leeks.   |
| 16. Twelve Onions, cured.   |
| 17. Twelve Onions, green.   |
| 18. Dish of Green Beans.  |
| 19. Dish of Green Peas, yellow podded.  |
| 20. Dish of Green Peas, green podded.   |
| 21. Twelve stalks Rhubarb.  |
| 22. Three Pumpkins for stock feeding.   |
| 23. Three Pumpkins for table use.   |
| 24. Three Marrows.  |
| 25. Twelve Tomatoes.  |
| 26. Best three Cucumbers.   |
| 27. Best dish of Eschallots.  |
| 28. Six bunches Spinach.  |
| 29. Six bunches Radishes.   |

Class:

30. Dish of Chillies.
31. Six Egg Fruit.
32. Twelve White Elephant Potatoes.
33. Twelve Magnum Bonum Potatoes.
34. Twelve Early Rose Potatoes.
35. Twelve Up-to-Date Potatoes.
36. Twelve German Blue Potatoes.
37. Any other variety Potatoes.
38. Six Sweet Potatoes.
39. 25 cobs American Pop Corn.

#### SECTION L.—FRUITS.

Entry fee, 1s. each Class, except in Classes 6 and 11, when 1s. must be paid for each variety entered.

Prizes :—Class 1 : 1st prize, £1 ; 2nd prize, 10s. All other Classes : 1st prize, 5s. ; 2nd prize, 2s. 6d.

Class.

1. Collection of Citrus Fruits, 5 of each variety allowed to be exhibited with name affixed.
2. Plate of Washington Novel Oranges.
3. Plate of Mediterranean Sweet Oranges.
4. Plate of Old Cape Oranges.
5. Plate of Jappa Oranges.
6. Other named varieties of Oranges.
7. Plate of Seedling Oranges.
8. Plate of Mandarines, named.
9. Plate of Naartjes, named.
10. Plate of Seedling Naartjes or Mandarines.
11. Named varieties of Lemons.
12. Plate Mazoe Lemons.
13. Plate Pompelos (grape fruit on pompelmus).
14. Plate Citrons.
15. Plate Shaddocks.
16. Plate Limes.

NOTE.—(1) A plate to consist of seven fruits. (2) The judging of all citrus fruits will, as far as possible, be on the standards adopted by California Societies.

Varieties entered in Classes 6 and 11 will be judged according to the standards for the variety exhibited, and any variety of sufficient merit may be awarded a prize.

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## The Transmission of Hydrophobia by Mice and Rats.

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Dr. Santour, a doctor of veterinary medicine in Constantinople, has published several interesting cases of hydrophobia caused by rats and mice.

The series of researches, which have been published of late in the French *Revue Scientifique*, seems to him to establish the fact that mice and rats are just as frequently, at least in the Orient, the cause of hydrophobia in men, as are dogs.

He relates the following characteristic case.



On May 24th, 1906, a medical man in Smyrna was consulted by a young man whose fiancée had died from hydrophobia seven days previously. The latter was afraid that he had contracted the disease himself, as kisses had passed between them a few days before the malady had manifested itself. He brought with him a certificate of the municipal medical man stating that on May 8th the young girl, eighteen years of age, was suddenly seized by symptoms that led to the immediate conclusion that she was suffering from hydrophobia. On the next day all the symptoms increased in intensity, and three medical men called in for a consultation unanimously diagnosed that it was a case of *rage furieuse*. They gave at the same time a fatal prognosis. The course of the disease was typical, and the patient went from bad to worse. On the seventh day paralysis set in, and on the ninth day after the first manifestation of the disease, she died. She never differed in her answers when interrogated by the medical men, by her mother, or by her fiancé. She emphatically declared that she had never been bitten by a rabid dog or a rabid cat. She stated, however, that six months previously she had some work to do in the cellar of her house, when suddenly a mouse jumped on her and bit her finger. There was a little flow of blood at the time, and the pain was sharp, but this subsided, and the patient did not attach any further importance to the matter. The attack of the mouse in the cellar, however, always remained very vividly in her memory.

As it was absolutely impossible to find any other cause, it is natural, Dr. Santour thinks, to conclude that the bite of the mouse was the origin of hydrophobia in the girl. He urges that more attention should be paid to the possibility of transmission of hydrophobia to man by rats and mice, and recommends that all persons bitten by these animals should be immediately sent to the institute for hydrophobia patients.—*The Lancet*.

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### Ramie.

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In a previous issue of the Journal, a short article was published, giving instructions for the cultivation of Ramie, or Rhea.

An Association has now been started for the encouragement of the growth of this fibrous plant.

The following is the pamphlet issued by the Association:

The Ramie Growing Association, under the patronage of Rt. Hon. Lord Mountmorres, Rt. Hon. Lord Hindlip, Rt. Hon. Lord Edward Spencer Churchill, F.R.M.S., Col. Hon. Francis C. Bridgman, Col. Hon. B. Bathurst, Col. Sir Frederic Cardew, K.C.M.G., Lt.-Col. Sir Edward Durand, Bart., C.B., Sir William Taylor, Bart., K.C.B., K.H.P., LL.D. (Glasgow), Sir Henry Seton-Karr, C.M.G., M. D. Mackenzie, Deputy Commissioner thar Pathar Sind, Major-General A. L. Playfair, C. J. Thynne (Queensland), E. G. S. Churchill, W. P. James Fawcus, M.I.C.E., M.I.E.E., John William Johnston, H. E. Aykroyd, George Sherriffs.

The following Agents-General for the Colonies have consented to co-operate by distributing Pamphlets, etc.: Cape Colony, South Australia, Victoria, Tasmania.

Hon. Scientific Adviser: Prof. Eric Drabble, D.S.C. (London), F.L.S. (Liverpool University).

## RAMIE (RHEA)—A PROMISING INDUSTRY FOR THE BRITISH EMPIRE.

Dear Sir,—It is proposed to form a Ramie Growing Association to foster the growth of Ramie throughout the Empire, and thus add a valuable asset to British agriculture, commerce and industry.

At the present time Ramie is grown largely in China, and in smaller quantities at different points throughout the British dominions. It is a fibre which for general utility is without a rival. It provides one of the best of clothing materials, being a non-conductor of heat, and, consequently, cool in the sun's rays and warm in winter. It is beautifully lustrous, in this respect resembling silk, and it retains its lustre undiminished after washing. It is exceedingly durable, and resists the roughest handling in laundry operations. Used as a tunic in the South African War, it outwore three cotton tunics served to the men in the same company, and with slight repairs to cuffs, the Ramie tunic in question would still be serviceable for a considerable time to come.

Ramie is equally suitable for ropes and cordage, nets, tent cloth, and all forms of coarse material for which hemp or jute are now ordinarily used. It is far stronger and more lasting than either of these fibres, and for rope-making it has many special advantages peculiar to it.

The merits of Ramie have long been known to textile manufacturers and fibre consumers in this country, but the supply has hitherto been too intermittent and unreliable for them to be able to adopt it on a large scale. Its superiority over all other fibres is coming to be generally admitted, and the demand for the fibre at the present time far exceeds the regular supply. If the production of the fibre were so increased that a large and constant supply could be assured to manufacturers, there is no doubt that it would be adopted on a much larger scale than at present is possible.

There is scarcely any plant which can be so widely cultivated over the earth's surface. It will grow and flourish in the temperate zone as well as in the tropics, and under almost any conditions of climate or soil. It is felt that encouragement alone is needed to induce planters in the British Colonies to adopt it on a large scale, and from every quarter, letters and correspondence indicate that the Colonist, more particularly in sub-tropical countries, is alive to the possibilities of this fibre.

This fibre can be produced profitably at £10 a ton. To-day the best cleaned samples are fetching £37, and even more, per ton. There is, therefore, an exceedingly wide margin of profit to encourage planters to engage in Ramie. No doubt, as the production increases, the price would, at first, at any rate, tend to decline. At £30 per ton, however, Ramie would come in competition with flax, and being superior and more suitable for most of the purposes for which flax is at present used, it would undoubtedly take the place of flax on a considerable scale. Further, if the price still fell as low as £20, it would come in competition with cotton, and here again would undoubtedly be used in preference to cotton in a very large proportion of those commodities which are at present made of cotton. Finally, if the price sank as low as £15, Ramie would reach the margin of jute. There is, therefore, it will be seen, a practically unlimited and continually extending demand for this fibre,



such demand growing rapidly as the supply tends to reduce its cost on the market, and even at the lowest price, when competing with jute, it would show a commercial profit of £5 a ton to the planter. There is, however, no reason to suppose that this lower price will be reached for many years to come. A long period of high prices and large profits is open to the grower.

There is probably no other crop so easy to grow, and no other produce so easy to prepare for the market as Ramie. For a few shillings sufficient plants to stock a whole plantation can be established. In a few months the crop is ready for cutting. The fibre is prepared by an exceedingly simple process, and the "ribbons," if properly dried, can be stored for any length of time in order that the grower may take advantage of favourable markets and of profitable opportunities for shipping in large consignments. When the time comes that the plantation is large enough to employ machinery for decorticating and degumming the fibre, the plant is of the simplest and cheapest description, and a Ramie Decorticator can be purchased for about £50.

Such then are the advantages of Ramie to the grower. It will be seen to how large an extent its cultivation would benefit British tropical and sub-tropical Colonies, but even more important from an Imperial point of view is another aspect of Ramie growing, viz.: its steadying influence on the cotton market. Were Ramie grown on a large scale, and the supply of it regular and sufficient, cotton crises could not occur; for so soon as the price of cotton rose, Ramie would come into competition with it; and thus remove the nightmare of cotton crises, with all their attendant misery and loss of capital. Ramie, as has already been pointed out, is superior to jute for those purposes for which it is at present employed.

At the same time, the outlook in the Manilla hemp market is a very depressing one for the British shipowner. Since the Philippines were occupied by the United States, practically the whole of the hemp produced has been consumed in America, and it is calculated that in the coming year the entire output of Manilla hemp will be required for harvesters in the United States alone. Ramie makes ship's cables of an even superior quality to those of Manilla hemp.

One of the largest flax-spinners writes: "There is no doubt it (Ramie) would be welcomed by the flax trade. Flax is deteriorating and becoming a decadent industry. It is dirty and wasteful. The outlook now that much land is out of cultivation in Ireland and Great Britain, added to the serious disturbances in Russia, which must throw agriculture, especially flax, back for many years, is very bad. I dream of a time when Ramie will come to us at a price that will enable us to do away with the dirty and wasteful flax, and to embrace the clean and silky fibre of the Ramie, which practically gives no waste or dirt."

In addition to these far-established industries which Ramie will benefit, viz., cotton, flax, jute, and hemp, it will also give rise to an industry of its own, being capable of uses to which no other fibre can be put, whilst in many minor industries it is preferable to most other fibres, such as incandescent gas mantles, surgical dressings, upholstery, underclothing, sail cloth, tarpaulins, tent and rick cloth, fishing nets, etc., etc., wherein its non-rotting, hygienic qualities and great strength give it advantages no other fibres possess.

Another argument in favour of Ramie cultivation, if one were wanted, is—the area of cotton growing is restricted; the world's population increases proportionally faster than cotton production.

As Ramie is an ideal clothing material, it is another argument in favour of giving it a trial in all our Colonies. Nor does it rest here, as it will follow in most of the Colonies where the industry is successfully established agriculturally that the manufacturing industry will follow.

The demand for Ramie will, as pointed out above, largely depend for some years to come on the magnitude of the supply, and there is no fear that the supply can outrun the requirements for a very long time to come. The objects of the proposed Ramie Growing Association will be (1) to give general encouragement to Ramie growing by popularising knowledge concerning its value and uses; (2) to supply information, seeds, and assistance to planters desirous of embarking in Ramie growing; and (3) to give assistance to both grower and manufacturer by placing them in touch with one another.

Members will be enrolled for purposes of co-operation.

Pamphlets will be distributed and will be supplied to members for distribution alike in this country and throughout the Colonies. The assistance of the Press will be sought in making the objects of the Association known, and in publishing articles on the merits and possibilities of the fibre, and the benefits to a Colony introducing the industry. Seed will be supplied to all those who desire to establish Ramie plantations, and from the outset sufficient to start a large plantation will be despatched on a nominal charge of 5s., which includes full cultural directions and entitles purchaser to a report on the production gratis. Pamphlets dealing with the whole method of growing, harvesting, and preparing Ramie will be distributed gratis. A register of all planters growing Ramie will be kept by the Association, and also a register of all manufacturers who use or are willing to use Ramie, and the price at which they are prepared to deal in it, and the extent of their requirements. The Association will be ready at all times to give advice to planters, to test and report on samples, to find a market for produce, and to introduce buyers, and in any other way further the interests of those who have embarked in the industry. It is hoped that in course of time the Association may come to be looked upon as the recognised organisation for the promotion and protection of the Ramie industry.

All who are disposed to help in the development of this most promising industry are invited to take part in the formation of the proposed Association by sending their names.

The Royal Horticultural Society, I am pleased to say, is advocating its exploitation. I have the pleasure to give you a copy of the letter:

ROYAL HORTICULTURAL SOCIETY.

RAMIE.

June 12, 1906.

Dear Sir,—I was glad to see your varied collection of Ramie at our Show. It was extremely interesting, and shows that the plant and its manufacture have great possibilities in the future if carefully and scientifically conducted experiments are carried out. The Council had much pleasure in awarding you a Silver Medal.

Yours faithfully,

W. WILKS.



The Royal Botanic Society are also recommending and advocating its extended cultivation. They also awarded a Silver Medal, and are publishing a report which I hope to send you later.

The Government has at last issued a bulletin recommending its cultivation, though I doubt if it will get beyond the pigeon-holes of the Bureaux of those to whom it has been sent, and it will still be left to the individual or a Ramie Growing Association to make it known.

I am pleased to see also our Agricultural and Horticultural and Botanic Societies, Technical Colleges, and Chambers of Commerce are alive to its merits. Special praise is due to that most up-to-date, painstaking and persevering, though very young institution, the Liverpool University. This admirable Institute of Commercial Research is making the claims of Ramie, the king of fibres, known to our Empire.

One of our leading Agronomists writes:—

“If there is anything in it at all it means that we have a new industry of no mean importance. It means not only that we may be able to grow and decorticate, but that later on, like the kindred industry of jute on the banks of the Hoogley, we may come to see the degumming, bleaching, and weaving of Rhea. Here we have an improvement of the right order, a new industry which bids fair to eclipse indigo even in its palmy days. Strength, assuming Rhea to be 100, hemp 36, flax 25, silk 13, cotton 12; its filaments  $2\frac{1}{2}$  to 18; it resists atmospheric influences; air and water have little influence on it, no matter how long exposed. These are only a few of its merits. It is lustrous like silk, an ideal clothing material.”

In conclusion, I am allowed to state that the above-mentioned gentlemen have kindly consented to allow their names to be given as recommending the objects of this Association, and it is hoped branches will be formed in every Colony. *Floreat Ramie.*

Yours faithfully,

D. EDWARDS-RADCLYFFE, Hon. Sec.,

Staines.

P.S.—Florists, Nurserymen and Seedsmen in all Colonies are particularly recommended to start Ramie growing plants, as the industry once being established, there is sure to be a demand for plants. Government and Municipal Farms, Agricultural Colleges, Botanic Gardens, etc., will render great service by distributing plants.

### FORM OF APPLICATION.

To D. Edwards-Radclyffe, Hon. Sec., Ramie Growing Association, Staines.

Please add my name to list of Ramie Growing Association.

Name .....

Address .....

Colony .....

Please send me .....pamphlets for distribution.

If seed is required (5s. packet, with Cultural Directions), please remit P.O. payable at Staines.

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## Practical Directions for Preserving Fruits and Vegetables.

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The proper preservation of fruits and vegetables for winter use is an important question for the housekeeper, especially the farmer's wife, since she has, or should have, an abundance of fresh fruit and vegetables, which if properly cared for, would greatly reduce both the doctor's and grocer's bills. The large canning factories will always supply the demand of the city population, but every farmer's wife can provide her own supply at a lower cost, and besides, she will know the true composition and purity of the goods.

Although our present knowledge of canning fruits and vegetables is far from complete, enough is known to enable those interested to make the undertaking a success.

## CONDITION OF THE FRUIT.

In selecting fruit for canning, it is advisable not to mix the different varieties together; for example, if plum preserves are made, each lot should be made from a distinct variety, or a combination of flavour will be the result; besides some varieties require more heat than others, thus giving the preserved product a lack of uniformity, so undesirable.

To ensure success in putting up fruit, a few precautions must be observed; namely, fresh perfect fruit, absolute sterilization of all utensils, the best grade of sugar, and other materials used.

It is important that the fruit intended for canning should be in the right stage of ripeness. This stage is difficult to describe, though in general it should be firm, having attained its full size and colour. It should be free from all kinds of blemishes, and all forms of insect life. Fruit intended for canning in any case should be utilised as soon as possible after it is picked. If left standing for hours, even if the fruit is not over ripe, the fine flavour is lost, and the keeping qualities greatly impaired.

## NOTES ON MAKING PRESERVES.

When fruit is put up by the oven method, either cover the oven with heavy asbestos paper, or place the jars in a dripping pan with a little cold water in the pan, and place a pan over the jars, as the fruit cooks faster in the top, and may turn a little dark if not covered.

In preserving, different fruits require different amounts of sugar; if a heavy syrup is wanted and no syrup gauge is at hand, use just enough water to liquify the sugar and heat very slowly, as sugar often crystallizes in the bottom of the jar, if boiled rapidly, and the fruit will not be sweet enough. In making syrup, when it begins to boil, run a wet cloth carefully round the edge of the pan, to take out the impurities in the sugar, leaving the syrup clear.

A good way to prevent moulding and improving the general keeping qualities of preserves is to cut out circular pieces of paper to fit over the preserves. Before placing it over the preserves, dip in melted paraffin wax, and on top of this paper pour melted paraffin wax,



making a layer an eighth of an inch in thickness. Paraffin wax may be obtained at the chemist, and is both cheap and effective.

### DIRECTIONS FOR MAKING JELLY.

Jelly making is the most interesting and the most uncertain of any of the ways of caring for fruit. Uncertain because so many conditions must be watched; but nothing adds to the finish of a table like perfect jelly. Fruit for jelly is best gathered a little unripe. Jelly made from fruit gathered after heavy rain will require a greater amount of boiling, and in some cases will not "jell" at all, owing to the lack of the starchy properties contained in the fruit. This, however, may be put into jars and sealed, and used for mince meat.

Great care should be taken in skimming jelly. The juice should not be stirred, but the scum skimmed off carefully. If allowed to boil over, the jelly will not be clear. In putting the jelly into glasses, sterilize the glasses, and drain them thoroughly, as otherwise air bubbles are apt to be in the jelly. When filling the glasses, fill each glass full before attempting to fill the next, as jelly will slide off in layers when turned out if put in a little at a time. Boil only a small amount of juice at one time, and use a shallow pan, as the water evaporates faster in a shallow pan, allowing the juice to "jell" in less time. Some people think that fruit that is not fit to can or preserve is all right for jelly, but this is not true. Perfect fruit is more essential for jelly than any other way of caring for fruit. Soft ripe fruit may be used for jams or marmalades.

Fruits such as strawberries, raspberries, peaches, which will not jell easily, make beautiful jelly if one-third rhubarb juice is used, and the flavour is not harmed by such addition.

### OLD WAY OF MAKING PLUM JELLY.

The old way of making plum jelly is to almost cover the fruit with cold water. Cook until soft, but not into a pulpy state, strain and let stand over night, carefully pour off the juice so as not to mix the settlings, and strain through a flannel bag. Measure the juice, and an equal amount of sugar, but do not add the sugar until the juice

has boiled for fifteen minutes. Then add the sugar, and boil slowly for three to five minutes, or until the juice will cling to the spoon in thick jelly drops. It is then ready to put into glasses.

### NEW WAY OF MAKING PLUM JELLY.

A new way to make plum and other jellies, is to place the fruit dry in jars. Two-quart jars are good for this purpose. Either place the jars in the oven on asbestos paper, or in a fruit steamer, and cook till fruit is tender. Take out and strain through a flannel bag. Add as much sugar as juice, and stir until the sugar is dissolved. Place on the back of the stove and heat slowly until it forms jelly drops on the spoon. During boiling, skim carefully. It takes but a little boiling as this is pure juice. This process produces the clearest and finest plum jelly.

The pulp may be used for jams or butter by straining through a sieve and adding an equal amount of sugar, and heating slowly till thick enough. Place in jars and seal as usual.

### DIRECTIONS FOR MAKING APPLE JELLY.

Cut the apples into quarters. They should not be cored or peeled. Cover with water and cook till tender, and strain. Let stand an hour or more and strain through a flannel bag. Measure out the same amount of sugar as juice, boil the juice fifteen minutes before putting in the sugar. Stir until the sugar is dissolved, and boil slowly till it jellies in a spoon. Plum juice may be added if a plum flavour is desired. Apple jelly often lacks flavour, and this can be enhanced by adding a small quantity of plum juice.

*Bulletin published by the University of Wisconsin.*

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## Orchard Notes.

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The feeding ground of the roots is not close to the trunk, but in a circle, whose radius is never less than half the height of the tree when matured. Some American fruit growers never irrigate within the shadow cast by the tree at noon. Only those who are ignorant of these

facts will manure and water the base of a tree. A man might as well try to quench his thirst by taking a bath as to cultivate trees by watering the hard wood in the trunk. Roots have to respire. If the soil is so compact as to exclude air, or if saturated with water, so as to keep out air, the roots will perish. Water-logged land is one of the results of unscientific cultivation, and asphyxiation is a common cause of fruit dropping.

The growth of a leguminous crop for green manuring is a well-recognised means of introducing fertility into the soil, and has been widely practised in some parts of the State for orchard lands. The question of keeping a fruit-garden permanently in grass is quite a different matter, and has few advocates in this State. In some quarters it is contended that the spores of the Black Spot fungus rise from the soil on its being stirred, and if instead of cultivating the land it is kept in grass, this objectionable pest can be controlled. The general practice in Tasmania is to keep the orchard land stirred, and this system seems to be borne out by some experiments carried out at the Woburn Fruit Farm. The conclusion arrived at after nine years' experiments shows that in that soil, at any rate, an apple tree can scarcely be stunted more effectually by any form of maltreatment than by growing grass over its roots; and that, therefore, unless trees behave very differently elsewhere, the grass orchard for the production of apples should be abandoned in favour of a plantation wherein the soil is cultivated. The experiments referred to above consist of from 200 to 250 apple trees grown in grassed ground, compared with similar trees grown in open soil. The soil was a loam of fair fertility resting on clay. One noticeable fact was that weeds produced far less bad effect on the trees than did grass. In seeking an explanation as to the injurious effects of grass, the questions of increased evaporation and deprivation of nourishment were carefully studied, but no logical conclusion could be adduced that either of the above were the cause of the trouble. The question of the roots being deprived of oxygen did not hold good in the light of certain experiments that were made. Mr. S. Pickering, who records the experiments, says: "The exclusion of all those possible explanations drives us to believe that the cause of the action of grass is due to some directly poisonous action



which it exerts on the trees, possibly through the intervention of bacteria, or possibly taking place more directly. The peculiarities of the effects of grass are certainly not the results of the mere stunting of the trees by unfavourable conditions. This is shown very clearly by a comparison of our grass plots with a similar plot in open soil, where the trees have been lifted every year and root pruned. These trees are now in a hopeless stunted condition, and are even less vigorous, both as to growth of wood and size of leaf, than the grass-grown trees; yet they show none of the peculiar leaf-colouring shown by the latter."—*Agricultural Gazette of Tasmania*.

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## Correspondence.

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Lo Magundi.

TO THE EDITOR, "AGRICULTURAL JOURNAL."

SIR,—

In your December issue, in Mr. Wise's Land Settlement Report, I notice he states:—

"I was told by one of the biggest cattle owners in the country that 100 cows will breed 80 to 90 calves a year."

This appears rather a large percentage, and in my small experience I have found that native cows—German East African—average a calf say every nineteen months.

I should be glad to learn the experience of others in this respect.

Yours faithfully,

NOVICE.

[This is an interesting point that "Novice" raises, and stock breeders who have been in the country for some time, will, I feel sure, give him the benefit of their experience.—EDITOR.]

Rhodes Inyanga Farm,  
Umtali.

TO THE EDITOR, "AGRICULTURAL JOURNAL."

SIR,—

The following particulars of my wool clip, sent to London this month, may be of interest to your Department, or the public.

|                          |          |            |
|--------------------------|----------|------------|
| 7 Bales Greasy, weighing | ... ..   | 2,050 lbs. |
| 16 Bales Scoured         | „ ... .. | 3,245 „    |

Yours faithfully,

FRED. E. WIENHOLT.

TO THE EDITOR, "AGRICULTURAL JOURNAL."

Beira,

28th December, 1906.

SIR,—

The following may be of interest to such of your readers as take an interest in Rubber.

All the samples came from three year old trees in our Ceara plantation on Gungunya, and in the light of subsequent experiments at Maruma, I feel fairly confident that not only in quality, but also in quantity of yield, our South Melsetter Ceara trees are going to prove satisfactory. Elevation: 3,500 feet; plantation situated at foot of Chirinda.

Copy of report on rubber samples from Gungunya, Melsetter:—

No. 1*a*.—Fine Ceara scrap, clean, pale, and fairly strong.

No. 1*b*.—Do. do. do. do. do.

No. 2.—Fair Ceara scrap, a little mixed in colour, clean, but rather weak, and sticky to the touch.

No. 3.—Fine Ceara scrap, clean, pale, and strong.

The values of Nos. 1*b* and 3, if shipped in quantity (say a few cwts.), would be about 5s. 2d., 5s. 6d. per lb. on to-day's market, with Brazilian Standard Rubber

"Hard cure fine," at 5s. 2d. per lb., and the merit of these samples, as indeed of all the six, is their cleanliness and freedom from impurities. The value of Nos. 1*a* and 2 would be a few pence lower than 1*b* and 3, say about 4s. 6d., 4s. 10d. per lb., provided always in quantity and well up to the small sample before us.

Of the four lots of scrap, we prefer the No. 3, which seems stronger and of lighter colour than No. 1*b*.

No. 4.—Small irregular Ceara biscuits, good, clean, and strong value to-day in quantity about 5s. 6d., 5s. 7d. per lb.

No. 5.—The yellow portion of this sample as No. 4, but the black piece ("boiled") is poor, weak, and lacking in resiliency.

No. 6.—As No. 4, perhaps the best sample of the lot, value in quantity about 5s. 7d. per lb.

(Sgd.) W. & J. THOMPSON.

38, Mincing Lane, E.C.

19th September, 1906.

I should mention that for lack of appliances, the above samples were not turned out in particularly attractive form. A few days ago I was shown a sample from one of the coast plantations, which had been valued at 14s. the kilo. In point of colour, toughness, and elasticity, I was unable to distinguish between it and some of my own samples; on the other hand, owing apparently to having been through a crepe-ribbon machine or some similar rolling and washing appliance, it exhibited a more even and attractive appearance than my own "Irregular biscuits," and this alone was quite sufficient, I think, to account for the difference in valuation. I was unable to learn the date on which it was valued. I shall be happy to supply any further details.

I am, Sir,

Yours, etc.,

C. F. MASSY SWYNNERTON.



## Epitome of Cattle Inspectors' Returns.

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DECEMBER, 1906.

### SALISBURY.

#### *African Coast Fever.*

Fresh Outbreaks: None.

Existing Outbreaks: No deaths.

#### *Epizootic Lymphangitis.*

Fresh Outbreaks: One case occurred in the Municipal Council stables; the infected animal, a mule, was destroyed.

Existing Outbreaks: The six infected animals reported last month as in quarantine were destroyed.

#### *Glanders.*

The following animals were tested with Mallien on importation, and found healthy: Horses, 26; donkeys, 20; mules, 12.

#### *Rabies.*

One dog suffering from Dumb Rabies destroyed.

### BULAWAYO.

#### *African Coast Fever.*

Fresh Outbreaks: None.

Existing Outbreaks: No deaths.

#### *Rabies.*

Three rabid dogs destroyed, also a suspected rabid baboon; G.V.S. Edmonds reports that this disease appears to be worse than it ever has been; that the cases that occur in Bulawayo appear, almost without exception, to be caused by starved curs belonging to natives coming into town and biting other animals.

He also states that he has heard of various cases which have not been reported.

*Epizootic Lymphangitis.*

Fresh Outbreaks: None.

Existing Outbreaks: One mule remains in quarantine.

*Glanders.*

The following animals were tested with Mallien and found healthy: Horses, 31; mules, 24; donkeys, 54.

UMTALI.

*African Coast Fever.*

Fresh Outbreaks: None.

Existing Outbreaks: No deaths.

*Pyæmia.*

One horse remains in quarantine.

INYANGA.

*Rabies.*

A kafir dog showing all the symptoms of rabies was destroyed at the farm Flacefell.

GWELO.

*African Coast Fever.*

Fresh Outbreaks: None.

Existing Outbreaks: No deaths.

*Rabies.*

Two rabid dogs destroyed at Selukwe.

## VICTORIA.

*African Coast Fever.*

The disease appeared amongst two lots of cattle at Zimbabwe. Seventeen infected animals died, or were destroyed, fifteen in-contacts, apparently healthy, were also destroyed with the owners' consent. This can hardly be called a fresh outbreak as the cattle were practically within the old infected area.

Three healthy herds in the vicinity were moved some distance away to clean veldt, and are still healthy.

Several native guards are stationed in the vicinity to prevent cattle straying on to the infected area.

Existing Outbreaks: Eleven deaths at No. 1 Concentration Camp. The cattle at this camp were removed to clean veldt on November 4th, and temperatures taken daily for 26 days; during this period six animals showed a temperature indication of fever, and were destroyed. On 30th November the cattle were again removed, Cattle Inspector Kayser remaining with them to continue the record of temperatures for a further period of 26 days.

## MELSETTER.

*African Coast Fever.*

Fresh Outbreaks: A suspicious case occurred at Mr. Brent's farm "Byarawa." The farm has been placed in quarantine as a matter of precaution.

Existing Outbreaks: No deaths.

## BELINGWE.

*Scab.*

Two native flocks under licence.

*Rabies.*

One rabid dog destroyed.

## ENKELDOORN.

No contagious disease.



## BULALIMA MANGWE.

*Rabies.*

One rabid dog destroyed at Plumtree.

## GENERAL.

*African Coast Fever.*

Total number of deaths during month, 28; do. corresponding month last year, 3.

N. W. SINCLAIR,

Chief Veterinary Surgeon.

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**Market Report.**


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|              |        | Bulawayo.    | Salisbury.   | Johannesburg. | Kimberley.   |
|--------------|--------|--------------|--------------|---------------|--------------|
| Mealies :    |        |              |              |               |              |
| White        | ... .. | 20/-         | 14/- to 16/- | 13/6 to 14/6  | 15/3 to 15/9 |
| Yellow       | ... .. | 18/6         | 14/- to 16/- | 13/9 to 14/3  | 14/9 to 15/3 |
| Kafir Corn : |        |              |              |               |              |
| White        | ... .. | 15/- to 16/- | 13/6         | 12/6 to 13/3  | 13/- to 13/6 |
| N'yauti      | ... .. | 15/-         | 13/6         | ...           | ...          |
| Oat Hay :—   |        |              |              |               |              |
| Per 100 lbs. | ... .. | 10/-         | 9/- to 10/6  | 5/6 to 7/-    | 4/6 to 6/3   |
| Grass Hay :— |        |              |              |               |              |
| Per ton      | ... .. | 50/-         | ...          | ...           | ...          |
| Rapoko       | ... .. | ...          | 11/6 to 13/6 | ...           | ...          |

Bulawayo.—Market quiet in all lines.

Salisbury.—Market very quiet, scarcely any business done for the last two weeks. Large stocks of both Rapoko and Mealies on hand.

Johannesburg.—Very few Mealies offered, prices slightly better. Kafir Corn, supply limited, values show little improvement. Oat Hay. Only the very best stuff fetches top prices.

Kimberley.—Mealies firm, especially for hard whites suitable for grinding.

## Rainfall.

STATEMENT OF RAINFALL RECORDED AT VARIOUS STATIONS IN  
SOUTHERN RHODESIA DURING THE MONTHS OF NOVEMBER  
AND DECEMBER, 1906.

COMPILED BY THE STATIST.

| NAME OF STATION.                  | NOVEMBER. |                          |                                       | DECEMBER. |                          |                                       |
|-----------------------------------|-----------|--------------------------|---------------------------------------|-----------|--------------------------|---------------------------------------|
|                                   | Amount.   | No. of<br>Rainy<br>Days. | Greatest<br>Amount<br>in<br>24 hours. | Amount.   | No. of<br>Rainy<br>Days. | Greatest<br>Amount<br>in<br>24 hours. |
| <b>MASHONALAND.</b>               |           |                          |                                       |           |                          |                                       |
| Borrowdale ... ..                 | 4'11      | 16                       | 1'57                                  | 6'22      | 10                       | 2'65                                  |
| Charter ... ..                    | 5'22      | 10                       | 1'38                                  | ...       | ...                      | ...                                   |
| Chilimanzi ... ..                 | 5'83      | 11                       | 3'30                                  | ...       | ...                      | ...                                   |
| Chishawasha ... ..                | 3'72      | 15                       | 1'81                                  | 3'11      | 11                       | 0'85                                  |
| Driefontein, Blinkwater ...       | 6'28      | 13                       | 1'51                                  | 7'65      | 10                       | 3'62                                  |
| Enkeldoorn ... ..                 | 5'24      | 12                       | 1'94                                  | 2'23      | 8                        | 1'26                                  |
| Experimental Farm, Salisbury ...  | 3'90      | 13                       | 1'84                                  | ...       | ...                      | ...                                   |
| Gutu ... ..                       | 4'65      | 13                       | 1'45                                  | ...       | ...                      | ...                                   |
| Gwebi Forest Reserve ... ..       | 6'65      | 11                       | 2'00                                  | 3'06      | 8                        | 0'70                                  |
| Hartley ... ..                    | 3'52      | 9                        | 1'40                                  | ...       | ...                      | ...                                   |
| Hartmann Hill, Salisbury ... ..   | 6'68      | 11                       | 2'06                                  | 0'86      | 5                        | 0'50                                  |
| Helvetia, South Melsetter ... ..  | 4'44      | 13                       | 1'58                                  | ...       | ...                      | ...                                   |
| Hospital, Salisbury ... ..        | 3'96      | 12                       | 1'63                                  | 2'83      | 10                       | 1'51                                  |
| Inyanga Police Camp ... ..        | 2'84      | 14                       | 0'98                                  | ...       | ...                      | ...                                   |
| Inyanga (Rufurara) ... ..         | 4'46      | 14                       | 1'32                                  | 4'19      | 15                       | 1'01                                  |
| Marandellas ... ..                | 3'29      | 16                       | 0'83                                  | 2'48      | 14                       | 0'58                                  |
| Macheke ... ..                    | 3'91      | 11                       | 2'00                                  | 4'53      | 10                       | 0'86                                  |
| Melsetter ... ..                  | 4'88      | 12                       | 2'43                                  | ...       | ...                      | ...                                   |
| Mount Darwin ... ..               | 3'90      | 9                        | 1'08                                  | ...       | ...                      | ...                                   |
| Progress Farm, Marandellas ... .. | 2'99      | 14                       | 0'50                                  | 0'92      | 7                        | 0'25                                  |
| Public Gardens, Salisbury ... ..  | 3'93      | 13                       | 1'74                                  | 2'42      | 8                        | 1'15                                  |
| Rusapi ... ..                     | 4'34      | 12                       | 1'68                                  | 3'45      | 14                       | 1'65                                  |
| Sinoia ... ..                     | 2'40      | 6                        | 0'82                                  | 3'30      | 8                        | 2'47                                  |
| Sipolilo ... ..                   | 2'86      | 8                        | 0'95                                  | 1'21      | 4                        | 0'57                                  |
| Umtali ... ..                     | 3'97      | 13                       | 1'00                                  | ...       | ...                      | ...                                   |
| Victoria ... ..                   | 6'06      | 7                        | 2'10                                  | 7'28      | 12                       | 3'02                                  |
| Westridge, Salisbury ... ..       | 3'97      | 12                       | 1'81                                  | 2'49      | 10                       | 0'89                                  |
| <b>MATABELELAND.</b>              |           |                          |                                       |           |                          |                                       |
| Bulawayo ... ..                   | 7'68      | 13                       | 4'75                                  | ...       | ...                      | ...                                   |
| Empandeni ... ..                  | 4'79      | 12                       | 2'18                                  | ...       | ...                      | ...                                   |
| Filabusi ... ..                   | 1'35      | 10                       | 0'52                                  | 2'84      | 9                        | 0'80                                  |
| Fort Rixon ... ..                 | 3'07      | 10                       | 1'16                                  | ...       | ...                      | ...                                   |
| Government House, Bulawayo ...    | 4'40      | 10                       | 2'62                                  | 5'61      | 9                        | 2'57                                  |
| Gwanda ... ..                     | 3'59      | 10                       | 1'16                                  | ...       | ...                      | ...                                   |
| Gwelo ... ..                      | ...       | ...                      | ...                                   | 3'08      | 8                        | 1'58                                  |
| Hopefontain ... ..                | 6'02      | 12                       | 3'16                                  | 3'36      | 13                       | 1'05                                  |
| Invati ... ..                     | 4'01      | 11                       | 1'21                                  | ...       | ...                      | ...                                   |
| Matopos ... ..                    | 4'87      | 18                       | 1'86                                  | 4'10      | 10                       | 1'91                                  |
| Shiloh ... ..                     | 3'90      | 11                       | 1'14                                  | ...       | ...                      | ...                                   |
| Selukwe ... ..                    | 4'33      | 11                       | 1'00                                  | ...       | ...                      | ...                                   |
| Tegwani ... ..                    | 2'09      | 6                        | 0'85                                  | 5'55      | 10                       | 1'50                                  |
| Tuli ... ..                       | 2'08      | 8                        | 0'90                                  | 3'68      | 7                        | 1'82                                  |
| Victoria Falls ... ..             | 4'02      | 10                       | 1'17                                  | 3'05      | 10                       | 0'88                                  |

All other Stations report no rain, or send no report.

SALISBURY, 11th January, 1907.

## Government Notices.

No. 285 of 1906.

Department of Agriculture,  
Administrator's Office,  
Salisbury, 20th December, 1906.

### RABIES.

**U**NDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby declare and make known that all and singular the Government Notices regarding the disease of Rabies now subsisting and in force in this Territory are hereby cancelled and repealed, and in lieu thereof the following shall have full force and effect:—

1. All and several the various Native Districts of Southern Rhodesia are hereby declared to be areas infected with the disease of Rabies.

2. Any Magistrate, Police Officer, Native Commissioner, Government Veterinary Surgeon or other official vested with the performance of functions under the "Animals Diseases Consolidation Ordinance, 1904," may, on it appearing to him that any dog or other animal is showing symptoms which justify investigation as to whether such dog or animal is suffering from rabies or not, order the proper detention, isolation and control of such dog or animal either in the hands of the owner or at some other suitable place.

3. Should any dog show symptoms which lead to the suspicion that such dog may be suffering from rabies, the owner thereof shall forthwith notify the fact to the nearest official vested with powers under these regulations, and shall either destroy the said dog or isolate and secure it for further observation.

4. On its appearing that any animal is actually suffering from rabies, any of the above mentioned officials may order the destruction of such animal, or may himself destroy it, and may further take control of or destroy, if deemed necessary, any animal which has been in contact with a rabid animal or an animal suspected of being rabid.

5. The carcases of all animals destroyed on account of their being infected with rabies shall be thoroughly burnt by the person or official destroying them, save that such parts as may be required for scientific investigation may be retained under proper precautions. In any case in which a human being has been bitten by a rabid animal, the head of such animal shall, if possible, be taken and sent to the nearest Veterinary Official.

6. The owner of every dog over three months old not already registered shall on or before the 31st day of January, 1907, register the same with an official appointed for the purpose, provided that this provision shall not apply to any Municipality, Township or similar area in which provision for registration exists and is duly enforced.

7. Subject to any penalty he may have incurred by not registering his dog before the 1st day of February, 1907, the owner of any unregistered dog liable to registration may register the same at any time after the said date.

8. On and after the said 1st day of February, the owner of every dog arriving at the prescribed age of three months, and the owner of every dog imported into Southern Rhodesia after that date shall register such dog in the same manner as prescribed in Section 6.

9. A registration badge shall be issued for each and every dog registered, and the said badge must be attached to a proper and sufficient collar to be supplied by the owner, which must be placed and kept on each dog registered.

10. A fee to cover the cost of registration and supply of the badge in the amount of sixpence will become demandable and payable on registration of each dog.

11. Any dog found at large after the 31st day of January, 1907, not having and bearing a duly issued registration badge, may be summarily destroyed by any person.

12. In any area appearing in the schedule hereto attached or which may hereafter be added to such schedule and so long as the area is retained in the schedule, every dog shall be kept muzzled with a leather or wire muzzle of



approved pattern or shall be secured in an enclosure or by chain in such a manner that it shall not have access to persons or animals nor other animals access to it.

13. Dogs in a scheduled area may be taken for exercise unmuzzled if led on a proper chain or leash or if securely coupled in pairs.

14. No dogs shall be moved from one scheduled area to another scheduled area unless a permit from an official of the Veterinary Department be first had and obtained and it shall remain muzzled *en route*.

15. No dog shall be moved from a scheduled area to an area not scheduled unless the permission of an official of the Veterinary Department be first had and obtained; on permission being given, such dog shall be kept muzzled, except as hereinafter provided, and shall be returned to the area from which it was taken within seven days from the date of such removal, and upon return shall be submitted to a constable or official of the Veterinary Department for inspection.

16. Any dog required to be muzzled may, for the purposes of sport or for hunting wild carnivora, be allowed to be unmuzzled while in actual use, provided that it shall be muzzled when within one hundred yards of any homestead or upon the town lands of any town.

17. If a dog which should be muzzled be found wandering at large without a muzzle but either bearing a registration badge or, if without one, appearing to be of some value, such dog may be taken charge of and conveyed to the nearest police station or post and shall be there detained for at least 48 hours. If claimed by the owner or some person on his behalf within that period and appearing free from rabies, it shall be released and handed over on payment of a maintenance fee of one shilling for each day or portion of a day's detention, and failing its being claimed may be sold, destroyed or otherwise dealt with. The payment of the said fee shall not relieve the owner from any penalties he may have incurred under these regulations.

18. Any person contravening any of the above regulations or failing to carry out any of the provisions thereof shall be liable on conviction to a fine not exceeding £10 for each offence or in default of payment to imprisonment with or without hard labour for a period not exceeding one month.

#### SCHEDULED AREAS.

1. Within a radius of 15 miles of the Township of Salisbury.
2. So much of the area outside Area No. 1 as is included within a radius of 15 miles of the Police Camp, Goromondzi, Salisbury District.
3. The whole of the Seki Native Reserve, Salisbury District.
4. Within a radius of 20 miles of the Umtali Township.
5. The whole of the Native Districts of Charter, Victoria, N'danga, Chibi, Chilimanzi, Belingwe, M'rewas, Selukwe and Inyanga.
6. Within a radius of 20 miles of Nengubo Mission Station, Marandella District.
7. That portion of the Hartley Native District bounded on West by Eastern Boundary of Mondoro Reserve from M'budzirimi Hill to Hartley-Beatrice Road, thence on North by Hartley-Beatrice Road to Beatrice Mine, thence on East by Beatrice-Charter Road to Charter Boundary, thence on South by Charter Boundary to M'budzirimi Hill.
8. The Magisterial District of Tuli.
9. Within a radius of 15 miles of the Morven Mine, situate in the Native District of Bubi.
10. Within a radius of 15 miles of the Market Square, Bulawayo.
11. Within a radius of 15 miles of Mutemerergwas Kraal, situate in the Makoni District.
12. Within a radius of 15 miles of the Alliance Mine, situate in the Native District of Salisbury.
13. So much of the area outside Areas Nos. 1 and 2 as is included within a radius of 15 miles of the homestead of the farm "Meadows," Salisbury District.
14. The North of the Insiza District, bounded as follows:—North and East Districts boundary with Edkins Road to Savemi River along this River to its source thence in a straight line to junction of Insiza-Belingwe Road where it cuts Eastern boundary.

15. An area within a radius of 20 miles of the farm "Redhill," in the Bulilima-Mangwe District.
16. So much of the area outside Area No. 13 as is included within a radius of 15 miles of Mr. Heberden's homestead at Usher No. 1, Matobo District.

No. 286 of 1906.

Department of Agriculture,  
Administrator's Office.  
Salisbury, 20th December, 1906.

### RABIES.

**U**NDER and by virtue of the "Animals Diseases Consolidation Ordinance, 1904," and with reference to Sections 6, 7 and 8 of Government Notice No. 285 of 1906, I do hereby declare and make known that all Native Commissioners and their assistants are hereby appointed Registration Officers for the purpose of registering dogs in terms of the said regulations, and that the following Police Officers are appointed Assistant Registration Officers at their respective stations for the purpose of registering dogs owned by Europeans:—

| Police Station.   |            |                  | Police Station. |  |
|-------------------|------------|------------------|-----------------|--|
| Officer in Charge | Gatooma    | N.C.O. in Charge | Enkeldoorn      |  |
| " "               | Filabusi   | " "              | Blinkwater      |  |
| " "               | Sebakwe    | " "              | Geelong         |  |
| " "               | Wankies    | " "              | Victoria Falls  |  |
| N.C.O. "          | Sipolilo   | " "              | Figtree         |  |
| " "               | Penhalonga | " "              | Ramaquaban      |  |
| " "               | Chipinga   | Trooper "        | Essexvale       |  |

No. 237 of 1906.

### GAME LAW CONSOLIDATION ORDINANCE, 1906: CLOSE SEASON, &c.

**U**NDER and by virtue of the powers conferred upon me by the "Game Law Consolidation Ordinance, 1906," I do hereby cancel and withdraw all notices relating to game preservation and issued in terms of "The Game Preservation Ordinance, 1899," and declare the following to be of force and effect in lieu thereof:—

#### CLOSE SEASON.

1. In the whole of Southern Rhodesia, the close season for game in Class "A" shall be from 1st November to 30th April in each year.
2. In the whole of Southern Rhodesia, the close season for game in Class "B" shall be from 1st December to 30th June in each year.
3. Up to 31st March, 1908, the following game shall be strictly protected and not hunted or destroyed within the respective areas mentioned:—
  - (a) Oribi, within the magisterial district of Charter.
  - (b) Grysbok, within the magisterial district of Bulawayo.
  - (c) Koorhaan, throughout Southern Rhodesia, except the magisterial districts of Charter and Victoria.
  - (d) All game within the limits of the commonages or townlands of Salisbury, Bulawayo, Umtali, Gwelo and Enkeldoorn.
4. The operation of Section 12 of the said Ordinance shall be suspended in regard to Class "A" up to 31st December, 1907, and Class "B" up to 30th June, 1907, from date hereof within the magisterial district of Melssetter.
5. That the operations of Sections 5 and 12 of the said Ordinance shall be suspended in regard to all game in Classes "B" and "C," except Ostrich, Elephant, Zebra, Hippopotamus, Rhinoceros, black and white; and all such of the Antelope species as are not contained in Classes "B" and "C" of the said Ordinance within the limits described in the schedule hereto, as to the districts of Hartley and Lo Magondi.

6. All game is strictly preserved and shall not be hunted or destroyed until further notice within the following area, which is declared a game sanctuary :—

An area in the Urungwe Sub-district of the District of Lo Magondi in the Province of Mashonaland, bounded as follows :—

On the North and West by the River Zambesi, starting at the point where the Lozenzi River joins the Zambesi and following the course of the latter river to its junction with the Sanyati River.

On the East by an imaginary line drawn from the junction of the Indurume and the Nyaodsa Rivers to the headwaters of the Lozenzi River and thence along the course of the Lozenzi River to its junction with the Zambesi River.

On the South by an imaginary line drawn due West from the point of junction of the Indurume and Nyaodsa to the Sanyati River, thence along the course of this river to where it enters the Zambesi.

#### SCHEDULE.

1. Hartley District.—Along the North side of the Railway from Umfuli Bridge to Umzwezwe Bridge, thence along the Umzwezwe River to its junction with the Umnyati, thence along the Umnyati to its junction with the Umfuli, along the Umfuli to its junction with the Umsengezi, up the Umsengezi to the Hartley-Lo Magondi footpath crossing near Madzorera Kraal, thence along the Hartley-Lo Magondi footpath to Umfuli Bridge.

2. The whole of the Lo Magondi district except within the limits declared a game sanctuary under Section 6 hereof.

No. 187 of 1906.

26th July, 1906.

#### IMPORTATION OF CATTLE.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby declare and make known that notwithstanding any general prohibition against the importation of cattle into this Territory such importation will be allowed under the following conditions :—

1. Cattle *bona fide* required for breeding purposes may be introduced from the Cape Colony provided that the permission of the Chief Inspector of Cattle is first obtained.

2. Every application for such permission shall be accompanied by a certificate in form A hereunto annexed.

3. Cattle introduced from the Cape Colony shall have not more than two permanent central incisor teeth : they shall be introduced by rail only and shall upon and after arrival at the importer's farm or at their destination be effectually isolated from all other cattle for such period as may be directed by the Chief Inspector of Cattle.

4. Cattle may be imported from North-Eastern Rhodesia provided that

(a) The permission of the Chief Inspector of Cattle be first had and obtained, which permission the said official shall have full discretion to refuse.

(b) All cattle be introduced by way of the port or town of Feira, which is hereby declared a port of entry for cattle, and taken to Sipolilos.

(c) Such cattle be submitted for inspection and passed by a duly authorised officer at Feira and at Sipolilos and such inspection be noted on the permit originally granted.

5. On and after the 1st day of November, 1906, Cattle may be imported from North-Western Rhodesia provided that,

(a) The permission of the Government Veterinary Surgeon at Bulawayo be first had and obtained, which permission the said official shall have full discretion to refuse.

(b) All Cattle imported shall be conveyed by the shortest possible route to the Railway Station at Victoria Falls, which is hereby declared a port of entry for cattle, and shall there be entrained and conveyed by rail to the centre of consumption.

(c) On arrival at their destination such cattle shall be subject to all the regulations controlling the movement and disposal of slaughter cattle.



6. Every application for permission to introduce cattle from North-Eastern and North-Western Rhodesia shall be accompanied by a certificate in the form B annexed to this notice.

7. Cattle may be imported from Great Britain or Ireland, provided

- (a) That every animal so imported is accompanied by a proper and satisfactory certificate signed by a qualified Veterinary Surgeon that such animal was submitted to and resisted the tuberculin test for tuberculosis either before being embarked or upon arrival in port, or
- (b) That if such certificate be not produced every animal so imported shall be submitted to such quarantining and testing for tuberculosis as may be directed or approved by the Chief Inspector of Cattle.
- (c) That in the event of any test ordered and made disclosing the existence of tuberculosis the animal infected shall not be removed alive from the place where quarantined, but shall be there killed, and the owner shall be allowed to deal with the carcase as he may deem fit except that he shall not without special permission from a Government Veterinary Surgeon allow the meat to be used for human consumption.
- (d) And that all of expenses of inspection, quarantine, testing, destruction or disposal shall be borne by the owner of such cattle.

8. Any person introducing cattle into Southern Rhodesia otherwise than in accordance with these regulations or submitting any certificate false in any material particular or refusing or neglecting to submit cattle introduced to proper inspections and tests, or failing to properly isolate such cattle when introduced shall be liable to a fine not exceeding £10 for every animal in connection with which the offence complained of is committed and in default of payment of any fine inflicted to imprisonment with or without hard labour for any period not exceeding three months and the cattle in regard to which the complaint has been laid and proved shall be liable to destruction without compensation.

#### ANNEXURE "A."

I certify that the animals enumerated below have been in my possession since birth, and that Lung sickness, Contagious Pleuro-Pneumonia or any other contagious or infectious disease has not existed amongst any of my cattle or on my farm within the last three years, and that such cattle in travelling to.....Station will not come in contact with any animals amongst which Lung sickness or any other infectious or contagious disease has existed during that period.

Signature.....

The above mentioned facts are to my knowledge true and correct.

Date.....

Resident Magistrate.

.....District.

Cape of Good Hope.

Number of Animals..... Bulls..... Heifers.....

Breed.....

Seller's name and address.....

Purchaser's name.....

Place in Rhodesia to which animals are being sent.....

## ANNEXURE "B."

I certify that the animals enumerated below have been in my possession for twelve months, and that no case of Lung sickness or other contagious disease has occurred amongst them or other cattle with which they have been in contact, and that in travelling to Feira (or Victoria Falls) they will not come in contact with any cattle amongst which Lung sickness or other contagious disease has existed during the last two years.

Signature.....

The above mentioned facts are to my knowledge true and correct.

Magistrate, District Commissioner, or J.P.  
N.E. Rhodesia.  
N.W. Rhodesia.

Date..... District.....

Number of Animals..... Bulls..... Cows.....

Heifers..... Bullocks.....

Breed.....

Seller's name.....

Purchaser's name.....

Place in Southern Rhodesia to which

animals are being sent.....

No. 188 of 1906.

26th July, 1906.

## AFRICAN COAST FEVER.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel and withdraw the regulations promulgated by Government Notices Nos. 264 of 1905 and 164 of 1906 and declare the following to be of full force and effect in lieu thereof within the Province of Matabeleland, exclusive of the District of Gwelo as described and defined by section 4 (c) of the "Southern Rhodesia Boundary Regulations Amendment Regulations, 1898," which area is hereby declared to be an area infected with a destructive disease and is hereinafter called the said area.

1. No cattle shall be moved from any other part of the Territory of Southern Rhodesia into the said area.

2. The movement of cattle to, from or across any defined area appearing in the schedule hereto or any area which may hereafter be added to that schedule so long as such area remains in and is not withdrawn from the schedule is absolutely prohibited save and except as is provided for in sections 3, 6 and 7 of these regulations.

3. The movement of all cattle within the said area is prohibited save and except

- (a) On permission granted by an Officer specially authorised thereto by the Administrator.
- (b) Within the boundaries of any single farm where such cattle are depastured.
- (c) Within an area of land enclosed by a substantial fence.
- (d) Within a radius of four miles of any native kraal situate within the boundaries of any Native Location or Reserve, and as is hereinafter further provided.

4. The movement of cattle for slaughter, *bona fide* farming, mining or breeding purposes or for private milk supplies shall be permitted under the written authority of an official thereto duly authorised subject to the following terms and conditions :

- (a) That cattle are moved to the nearest or most suitable railway station or siding, and thence by rail to their destination, or, where the district is not served by a railway by the most suitable route to their destination, all cattle travelling by road shall be under the personal supervision of a responsible white man approved of by the Cattle Inspector or of a native approved of by the Native Commissioner and the Cattle Inspector of the district within which the movement takes place.
- (b) That written permission of owners, occupiers or managers of all occupied land, and in the case of Native Reserves, of the Native Commissioner of the District over which such cattle shall pass to the nearest station, siding or destination is obtained ; provided that in the event of such owners, occupiers, managers or Native Commissioner refusing to grant such permission, the Controller of Stock may direct the issue of a permit of removal, if satisfied that the necessary permission is withheld without good and sufficient cause.
- (c) That such cattle shall before being moved, be thoroughly disinfected by dipping or by spraying to the satisfaction of the Officer issuing permit, and at the expense of the owner of such stock, and if intended for slaughter shall where possible be branded under the supervision of the Officer issuing permit with the letters "V.D." on the near side of neck.
- (d) That cattle intended for slaughter shall, on arrival at destination subject to the terms of clause (e) hereof, be immediately taken to the prescribed quarantined area and there be quarantined and confined, and where not branded in terms of clause (c) hereof, be similarly branded under the supervision of a duly authorised officer.
- (e) That all cattle intended for slaughter brought to their destination and not disinfected by dipping or spraying in terms of clause (c) hereof shall be immediately taken to the public dipping station and there be thoroughly dipped or sprayed before being taken to the quarantine area.
- (f) That all cattle admitted to the quarantine area shall be slaughtered within twenty-one days of their admission, and under no pretext whatever shall cattle so admitted be permitted to leave the said area alive ; all such cattle shall after admission to the said area be considered as likely to be infected with disease and if found wandering outside the said area or in possession of any person may be destroyed under an order of the Chief Inspector or Controller of Stock.
- (g) That on arrival at destination cattle other than slaughter cattle shall be dipped or sprayed and shall be effectually isolated from all other cattle on the same land for a period of four weeks.

5. The movement of working cattle may be permitted under the following conditions only :—

- (a) Within a radius of six miles of any working mine or mine in course of development for the purposes of such mine, provided that such cattle shall only be moved under a permit of a duly authorised officer, and shall be dipped every fourteen days or where no dipping tank is available be thoroughly sprayed with an approved dip, provided further that such permission shall not be granted when it conflicts with any other section of these regulations, or if such movement is considered dangerous to other cattle within the six mile radius.
- (b) Within the said area from private farms and trading stations to any centre of consumption or to a Railway Station or Siding within the said area under the permit of a duly authorised officer, which permit shall fully set forth the route to be traversed, provided that no such permit shall be issued until the person applying for same shall produce the written consent of the owners, occupiers or managers of occupied lands proposed to be traversed, and, in the case of Native



Reserves, of the Native Commissioner, and that such cattle shall before being moved be thoroughly disinfected by dipping or spraying at the expense of the owner and to the satisfaction of the Officer issuing the permit; provided further that in the event of such consent being unreasonably withheld, the Controller of Stock may direct the issue of a permit.

6. In the event of the failure of pasturage or water on land on which cattle are located, the movement of such cattle will be permitted, provided:—

- (a) That such movement shall be to nearest available pasturage by the most suitable route.
- (b) That written consent be obtained in terms of Section 4 (b) hereof.
- (c) That movement shall be by permit only of a duly authorised officer, and under the supervision of a responsible white man, or of a native approved of by the Cattle Inspector and Native Commissioner of the district.

7. For the purposes of cleansing an area from disease the Controller of Stock may, on the authority of the Administrator and on the advice of the Chief Inspector of Cattle, and subject to such conditions as may be stipulated, permit the removal of cattle from a scheduled area to an adjacent clean area.

8. All applications for the removal of cattle under sections 4 and 5 hereof shall be submitted to and approved of by the Veterinary Department before being granted and when such movement is from one Native District to another the application shall be submitted for the approval of the Government Veterinary Surgeon at Bulawayo and the Native Commissioners of the Districts to and from which the removal is made.

9. All permits granted under the provisions of this notice shall specify the number and brands of cattle, route to be traversed, and time allowed for each journey; any breach of these or other conditions endorsed on the permit by the issuing officer shall be deemed a contravention of these Regulations in terms of section 14 hereof.

10. All veld-fed animals within the limits of the various Commonages or Townlands or other centres where there is common grazing ground, and wherein cases of African Coast Fever have occurred within two years of the date of publication hereof, and upon which public dipping tanks have been established, shall be dipped therein at least once every fourteen days: provided that the Controller of Stock may, on the advice of the Veterinary Department, direct the temporary suspension of this regulation for such reasons as he may regard as sufficient.

11. The following charges shall be paid at the time of dipping by the owner of the cattle or other animals required to be dipped under these Regulations in respect of any dipping done at a public dipping tank:—

|   |                    |
|---|--------------------|
| For cattle (over six months) . . . . .      | 3d. per head.      |
| For horses and mules . . . . .              | 3d. „              |
| For calves (six months and under) . . . . . | 2d. „              |
| For small stock . . . . .                   | $\frac{1}{2}$ d. „ |

with a minimum charge of 6d. for any number of animals not aggregating such fee under above tariff.

12. Any disinfecting by spraying required to be done under these regulations shall be carried out with an approved insecticide by the owner of the animals so sprayed; provided that the Inspector may, at his discretion, carry out such disinfection with the assistance of and at the entire cost of the owners of the animals to be sprayed, the cost of such disinfection being payable at the time of the spraying.

13. Whenever the owner, occupier, or manager of a farm shall adopt measures for the cleansing of his cattle running thereon, either by spraying or dipping or by any other method permitted by these or any other regulations, the Cattle Inspector may order such natives or others as have cattle on the said farm to cleanse such cattle, and the Native Commissioner of the District in which such farm is situated may enter into an arrangement with the native owners of cattle to cleanse such cattle at a charge to be mutually agreed between the said owner, occupier, or manager and the said native owners.

14. Any person contravening any of the provisions of these regulations shall, upon conviction, be liable in respect of each offence to the fines and punishments prescribed by the Ordinance, and in cases where no special punishment is provided, to a fine not exceeding £20, or in default of payment to imprisonment with or without hard labour for any period not exceeding three months, unless the penalty be sooner paid.

#### SCHEDULE.

- (1) Fingo Location.
- (2) An area within a radius of ten miles of Ntolas Kraal on the farm Emangeni.
- (3) An area comprising the farms Upper and Lower Umvutcha, Reigate, Upper Nondwenene, Mapane, Government Farm No. 5, Trenance and the plots adjoining the farms Umvutcha.

No. 189 of 1906.

26th July, 1906.

#### AFRICAN COAST FEVER.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel and withdraw the regulations promulgated by Government Notices Nos. 223 of 1905 and 115 of 1906, and declare the following to be of full force and effect in lieu thereof within the Province of Mashonaland and the Fiscal Division of Gwelo as defined by the "Southern Rhodesia Boundary Regulations Amendment Regulations, 1898," which areas are hereby declared to be areas infected with a destructive disease:—

1. The movement of all cattle within the said area is prohibited save and except:—

- (a) On permission granted by an officer specially authorised thereto by the Administrator.
- (b) Within the boundaries of any single farm where such cattle are depastured.
- (c) Within any area of land enclosed by a substantial fence.
- (d) Within a radius of four miles of any native kraal situate within the boundaries of any native location or reserve and as is hereinafter further provided.

2. The movement of cattle for slaughter purposes shall be permitted under the written authority of an officer thereto duly authorised, subject to the following terms and conditions:—

- (a) That such cattle are moved to the nearest or most suitable railway station or siding, and thence by rail to the centre of consumption; or, where the district is not served by a railway, by the most suitable route to the centre of consumption, all cattle travelling by road to be under the personal supervision of a responsible white man approved of by the Cattle Inspector, or of a native approved of by the Native Commissioner and the Cattle Inspector of the district within which such movement takes place.
- (b) That the written permission of owners, occupiers or managers of all occupied land, and, in the case of Native Reserves, of the Native Commissioner of the District over which such cattle shall pass to the nearest station, siding or centre of consumption is obtained: provided that in the event of such owners, occupiers, managers, or Native Commissioners refusing to grant such permission, the Controller of Stock may direct the issue of a permit of removal if satisfied that the necessary permission is withheld without good and sufficient cause.
- (c) That such cattle shall, before being moved, be thoroughly disinfected by dipping, or spraying, to the satisfaction of the officer issuing permit, and at the expense of the owner of such stock; and where possible, be branded under the supervision of the officer issuing permit with the letters "V.D." on near side of the neck.

- (d) That such cattle shall, on arrival at the centre of consumption, subject to the terms of Clause (c) hereof, be immediately taken to the prescribed quarantine area and there be quarantined and confined and, where not branded in terms of Clause (c) hereof, be similarly branded under the supervision of a duly authorised officer.
- (e) That all cattle brought into any centre of consumption and not disinfected by dipping or spraying in terms of Clause (c) hereof shall be immediately taken to the public dipping station and there be thoroughly dipped or sprayed before being taken to the quarantine area.
- (f) That all cattle admitted to the quarantine area shall be slaughtered within twenty-one days of their admission, and under no pretext whatever shall cattle so admitted be permitted to leave the said area alive. All such cattle shall, after admission to the said area, be considered as likely to be infected with disease, and, if found wandering outside the said area or in possession of any person, may be destroyed under an order of the Chief Inspector or Controller of Stock.

3. The movement of cattle required for *bona fide* mining, farming, breeding and dairying purposes, and for private milk supplies, may be permitted on the written authority of a duly authorised officer, subject to the following terms and conditions:—

- (a) That such movement shall take place subject to the conditions set forth in Section 2, clauses (a), (b) and (c): provided that it shall not be necessary to brand such cattle as required by Clause (c).
- (b) That on arrival at destination such cattle shall be effectually isolated from all other cattle on the same land for a period of four weeks.
- (c) That the consent in writing to such movement be obtained from all owners of cattle on farms adjoining that to which movement takes place, and in the case of Native Reserves, of the Native Commissioner of the district, provided that should such consent be unreasonably withheld by any of the aforesaid persons, the Controller of Stock may direct the issue of a permit.
- (d) That such cattle required for breeding and dairying purposes or for private milk supplies, when moved to within the boundaries of the various commonages, town lands, or of grazing land common to any mining camp or other centre where cases of African Coast Fever have occurred within two years, shall, if deemed necessary by the Chief Inspector of Cattle, be confined in some enclosed place approved of by the local Cattle Inspector, and, if a case of African Coast Fever occur in such enclosure, shall not be liberated therefrom except in terms of Section 4, Clause (b) hereof, until twelve months after the last occurrence of African Coast Fever within the enclosure in which they are kept; nor shall they be allowed after liberation to run upon any of the land specified herein, unless such land has been free from African Coast Fever for a period of twelve months.
- (e) All cattle introduced in terms of the preceding Sub-section (d) shall, on arrival, if not previously disinfected in terms of Section 2, Clause (c), be taken direct to the Government dipping station and dipped or sprayed.
- (f) All cattle confined in terms of this section and all calves born within the said enclosures shall be sprayed every fourteen days as may be directed by the Cattle Inspector.
- (g) No cattle shall be moved from one Native District to another unless with the permission of the Chief Inspector of Cattle and the Native Commissioners of the districts to and from which such movement takes place.

4. All calves under twelve months old running within the boundaries of the various commonages, town lands, or on grazing ground common to any mining camp or other centres where cases of African Coast Fever have occurred within twelve months of the date of these regulations, or born thereon after such date, shall be removed to some enclosed place approved of by the local Cattle Inspector, and shall not be liberated or allowed to run at large on such commonage, town lands or common grazing ground until twelve months



after the occurrence of the last case of African Coast Fever within the enclosure in which they are confined or upon such commonage, town lands or common grazing ground.

- (a) No calves shall be permitted to accompany working cattle travelling, and all calves born of such working cattle whilst travelling shall not be removed from the place where born.

5. For the purpose of cleansing an area of disease, the Controller of Stock may, under the authority of the Administrator and on the advice of the Chief Inspector of Cattle, subject to such conditions as may be stipulated, permit the removal of calves and other cattle to an adjacent clean area.

6. The movement of working cattle other than those specified in Section 7 hereof, may be permitted within the following areas and on the terms and conditions hereinafter set forth:—

- (a) Within a radius of ten miles of any working mine, or mine in course of development, for the purposes of such mine: provided that

- (1) Such cattle shall only be moved under permission of a duly authorised Officer, and shall be dipped every fourteen days where a dipping tank is available within such area, or, in the absence of a dipping tank, be thoroughly sprayed with an approved insecticide;
- (2) That such permission shall not be granted where it conflicts with any other section of these regulations, or, if such movement is considered to be dangerous to other cattle within the ten mile radius.

- (b) Within the boundaries of the following Native Districts, viz., Lomagundi, Marandellas, M'Rewas, M'Tokos, Makoni, Hartley, Inyanga, North and South Mazoe, Charter and Gwelo, as defined by Government Notice No. 13 of 1899, and from the farms "Shitowa" and "Soul Prop" to the Chiodzani Drift situate in the Umtali District, for *bona fide* farming purposes, subject to the following conditions:—

- (1) That the movement will be permitted for such period as the Controller of Stock may in his discretion, and on the advice of the Chief Inspector of Cattle, deem expedient, provided that such permission may at any time be withheld or withdrawn without notice.
- (2) That all applications for removal shall be approved of by the Chief Inspector of Cattle and the Native Commissioner of the District.
- (3) That the consent of owners, occupiers or managers of occupied lands, or Native Commissioners is obtained in terms of Section 2, Clause (b).
- (4) That all such cattle are dipped every fourteen days, where a tank is available, or, in the absence of a tank, are thoroughly disinfected by spraying.

7. The movement of "salted" or immune working cattle shall be permitted on the following terms and conditions:—

- (a) That such cattle have been registered and branded under the supervision of the Cattle Inspector with the brand "T.O." on near shoulder and the registration number on near horn, in terms of Section 7, Clauses (a) and (b) of Government Notice No. 109 of 1905.
- (b) That the movement of such cattle shall only take place under the written permit of a duly authorised officer and subject to the condition that they are disinfected by dipping every fourteen days, where a dipping tank is available, or in the absence of a dipping tank, by thorough spraying with an approved insecticide.
- (c) That movement of such cattle shall only be permitted:—

- (1) From the area comprised within the boundaries of the farms Mount Pleasant, Rhino Valley, Cheshire, Doorn Hoek, Vlaknek, Turner's and Sterkstroom in the Inyanga District, along the main road, between that area and the Rusapi Railway Station: provided that such cattle are dipped at Inyanga Police Station every fourteen days, and are not outspanned within a limit of four miles of Rusapi Station.

- (2) Along the main roads between the Old Umtali Township, the Penhalonga Mine and Umtali.
- (3) Along the main road from Umtali to Melsetter and Mount Silinda and all confluent roads on the infected area.

8. In the event of failure of pasturage or water on land on which cattle are located, the movement of such cattle will be permitted, provided :

- (a) That such movement shall be to the nearest available pasturage by the most suitable route.
- (b) That written consent be obtained in terms of Section 2, Clause (b) hereof.
- (c) That such movement shall be by permit only of a duly authorised officer, and under the supervision of a responsible white man, or of a native approved of by the Cattle Inspector and Native Commissioner of the District.

9. All applications for the removal of cattle under Sections 2, 3 and 8 hereof shall be submitted to and approved of by the local Veterinary Officer before being granted.

10. All permits granted under the provisions of this Notice shall specify the number and brands of cattle, route to be travelled and time allowed for each journey, and all conditions endorsed on such permits by the officer issuing the same shall be strictly observed.

11. All veld-fed animals within the limits of the various Commonages or Town Lands or other centre where there is common grazing ground and wherein cases of African Coast Fever have occurred within two years hereof, and upon which public dipping tanks have been established, shall be dipped therein at least once every fourteen days : provided that the Controller of Stock may, on the advice of the Veterinary Department, direct the temporary suspension of this regulation for such reasons as he may regard as sufficient.

12. The following charges shall be paid at the time of dipping by the owner of the cattle or other animals required to be dipped under these regulations in respect of any dipping done at a public dipping tank :—

|   |               |
|---|---------------|
| For Horned Cattle (6 months and over) . . . . .       | 3d. per head. |
| For Horses and Mules . . . . .                        | 3d. „         |
| For Calves (6 months and under) and Donkeys . . . . . | 2d. „         |
| For Small Stock . . . . .                             | ½d. „         |

with a minimum charge of 6d. for any number of animals not aggregating such fee under above tariff.

13. Any disinfecting by spraying required to be done under these regulations shall be carried out with an approved insecticide by the owner of the animals so sprayed : provided that the Inspector may, at his discretion, carry out such disinfection with the assistance of and at the entire cost of the owner of the animals sprayed, the cost of such disinfecting being payable at the time of spraying.

14. Whenever the owner, occupier or manager of a farm shall adopt means for cleansing his cattle running thereon, either by spraying or dipping or any other method permitted by these or any other regulations, the Cattle Inspector may order such natives or others as have cattle on the same farm to cleanse such cattle, and the Native Commissioner of the district in which such farm is situated may enter into an arrangement with the native owners of cattle to cleanse such cattle at a charge to be mutually agreed upon between the said owner, occupier or manager and the said native owners.

15. Any person contravening the provisions of these regulations shall be liable to the punishments prescribed by the Ordinance, and in cases where no special punishment is prescribed by the said Ordinance to a fine of £20 or to three months' imprisonment with or without hard labour in default of payment of any fine inflicted.

## Departmental Notices.

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### DESTRUCTION OF WILD CARNIVORA.

It is hereby notified for public information that commencing on 15th June, 1906, rewards will be paid for the destruction of wily carnivora, within the limits of Southern Rhodesia, on the following terms and conditions, viz. :

£2 10s. each for Lions.

£1 each for Leopards and Cheetahs.

10s. each for Wild Dogs.

5s. each for Jackals, Tiger Cats and Redcat or Lynx.

2s. 6d. each for Baboons.

1s. each for Grey Monkeys.

Rewards will be paid to Europeans by the Magistrate or Native Commissioner, and to natives by the Native Commissioner of the District.

In proof of destruction, applicants for rewards will be required to produce and surrender the skulls of lions and the tail and skin of head and neck of other animals destroyed. Of young animals, where the tail is less than six inches in length, the complete skin must be produced.

Applicants must be prepared to make a solemn declaration to the effect that the animals for which rewards are claimed have been captured and killed within the boundaries of the district of Southern Rhodesia wherein the claim is made and subsequent to June 15th, 1906.

### FARM APPRENTICES.

The Secretary for Agriculture would be glad to receive the names of farmers who would be willing to receive young Englishmen desirous of obtaining acquaintance with local systems of agriculture before taking up land on their own account, and also the terms on which such would be received, as he is in constant receipt of enquiries for such employment.

### STRYCHNINE.

Stockowners can obtain a limited quantity of strychnine for the destruction of carnivora at a cost of 1s. 6d. per half ounce.



## DONKEYS.

The B.S.A.P. Transport Department offer two pure-bred Zanzibar donkey stallions for service. Stud fee, ten shillings. Further particulars may be obtained from the O.C., Transport, Salisbury.

## GOVERNMENT STALLIONS FOR PUBLIC STUD.

The stallions "Robber Knight," and "Dolfos" having been secured for public stud purposes in the Provinces of Matabeleland and Mashonaland respectively, will be stationed at Bulawayo and Salisbury, where a limited number of mares can be served free of charge.

Applications, giving full particulars of the mares to be served, should be addressed to the Veterinary Officers at Bulawayo and Salisbury, from whom further particulars can be obtained.

The owners of mares brought to stud will have to make all necessary arrangements for attendance, stabling and feeding of their animals, as the Department can take no responsibility whatever.

As the number of mares which can be served is very limited, the Veterinary Officers in charge are instructed to refuse service if any mare submitted is suffering from any hereditary disease or is of an inferior type.

## VAPORITE.

The new preparation, "Vaporite," suitable for the destruction of cut-worms, wire-worms, white ants, and other soil-infesting pests, can be obtained from the Department in quantities of not less than 2 cwt. at 17s. 6d. per cwt. Application to be accompanied by remittance covering cost and transport charges.

## GRAM.

A limited quantity of fresh imported seed is available at 3½d. per lb. on application to the Department, accompanied by remittance for cost and transport.

## PRIZE COMPETITION FOR RHODESIAN GROWN TOBACCO LEAF.

The following prizes are offered by the British South Africa Company to be awarded for the best crops of tobacco leaf grown each season during the two years, 1907 and 1908.

1. For Rhodesian grown leaf from Turkish seed and cured in the usual Turkish manner.

(a) Best crop weighing between one thousand and five thousand pounds: £25.

(b) Best crop weighing five thousand pounds and over: £75.

2. For Rhodesian grown leaf from American seed and flue cured.

(a) Best crop weighing between one thousand and five thousand pounds: £25.

(b) Best crop weighing five thousand pounds and over: £75.

### CONDITIONS OF COMPETITION.

1. All competing crops must be cured, dried, packed in bales and delivered for sale at one of the Company's warehouses in Rhodesia.

2. Picked or selected exhibits representing but a portion of a crop cannot enter for competition.

3. Any or all competing crops may be disqualified by the Judges, if in their opinion they are not properly packed or in keeping condition.

4. Two Judges, both expert tobacco leaf men, will be appointed, one to be nominated by the British South Africa Company, and the other by the Rhodesian Agricultural Union. If necessary, an Umpire may be nominated by the Judges.

5. No competitor shall enter for both prizes in the same class.

6. All competing crops shall be the product of the season in which they are entered for competition.

7. Crops can be lodged at one of the Company's warehouses, which will be advertised later, any time during the season up to the end of December, but notice of intention to enter for competition should be sent to the Agricultural Department at as early a date as possible, and not later than 31st October in each year.

## Editorial Notices.

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Original subscribers to the *Journal*, who have complete sets of the earlier numbers to dispose of, are requested to communicate with this office, as numerous enquiries for the first and second volumes, now out of print, have been received.

Subscriptions to the *Journal* (5s.), issued bi-monthly, should be addressed to the paymaster, Agricultural Department, Salisbury. Only communications relating to the literary department should be addressed to the Editor, and if an answer is required in the pages of the *Journal*, should reach this office not later than the 15th of the month preceding publication. Charges for the insertion of advertisements will be forwarded upon application to the paymaster. Subscribers are requested to notify immediately the non-delivery of the *Journal*.

Farmers requiring latest market prices for produce and live stock at Kimberley, Johannesburg, Bulawayo, Gwelo, Salisbury, Umtali, and Beira, can obtain same from this office by next mail or prepaid wire.

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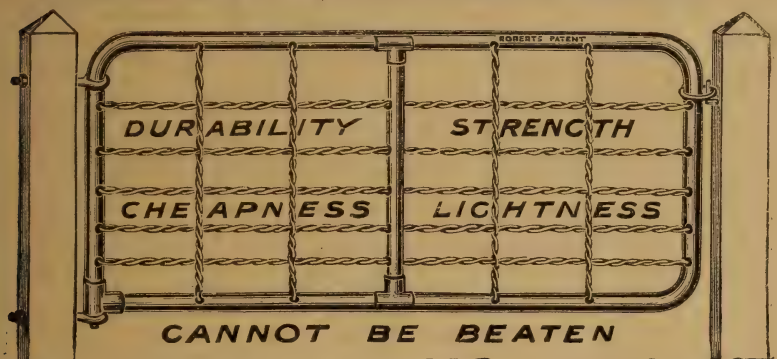
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| 1 inches      | 13 feet         | £3 5 0         | 2 inches      | 15 feet         | £3 17 6        |
| 1 1/2 "       | 14 "            | 3 7 6          | 2 "           | 16 "            | 4 0 0          |
| 1 3/4 "       | 15 "            | 3 10 0         | 2 "           | 17 "            | 4 2 6          |
| 1 1/2 "       | 16 "            | 3 12 6         | 2 "           | 18 "            | 4 5 0          |

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| 1 inch        | 2 to 4 feet     | £1 0 0         | 1 1/2 inches  | 7 feet          | £2 5 0         |
| 1 1/4 inches  | 2 to 4 feet     | 1 5 0          | 1 3/4 "       | 8 "             | 2 7 6          |
| 1 1/2 "       | 5 "             | 1 7 6          | 1 1/2 "       | 9 "             | 2 10 0         |
| 1 3/4 "       | 6 "             | 1 10 0         | 1 3/4 "       | 10 "            | 2 12 6         |
| 1 1/2 "       | 7 "             | 1 12 6         | 1 3/4 "       | 11 "            | 2 15 0         |
| 1 3/4 "       | 8 "             | 1 15 0         | 1 1/2 "       | 12 "            | 2 17 6         |

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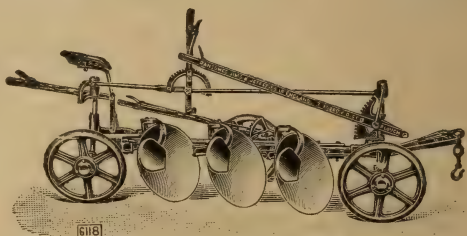
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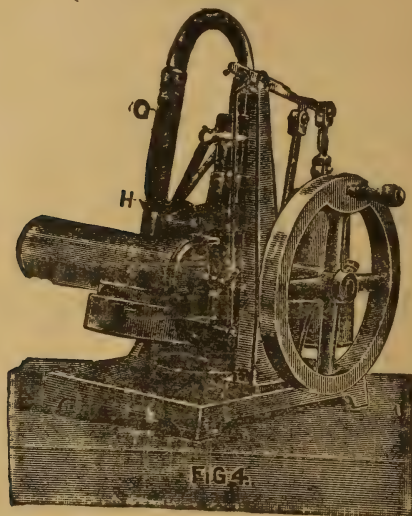
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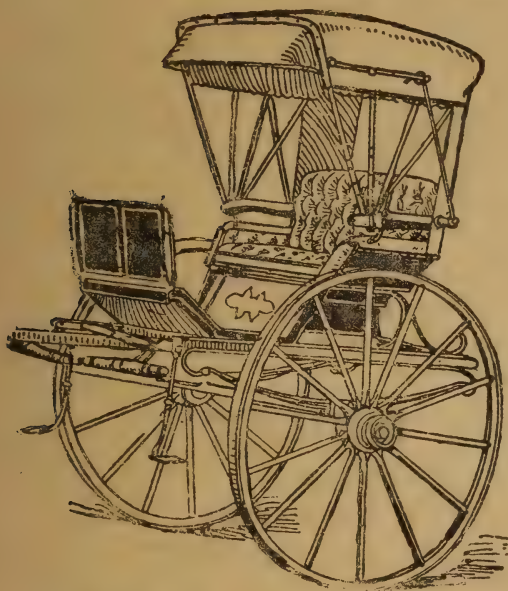
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*Issued by the Agricultural Department.*

EDITED BY L. A. KING=CHURCH.

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VOL. IV.—No. 4.]

APRIL, 1907.

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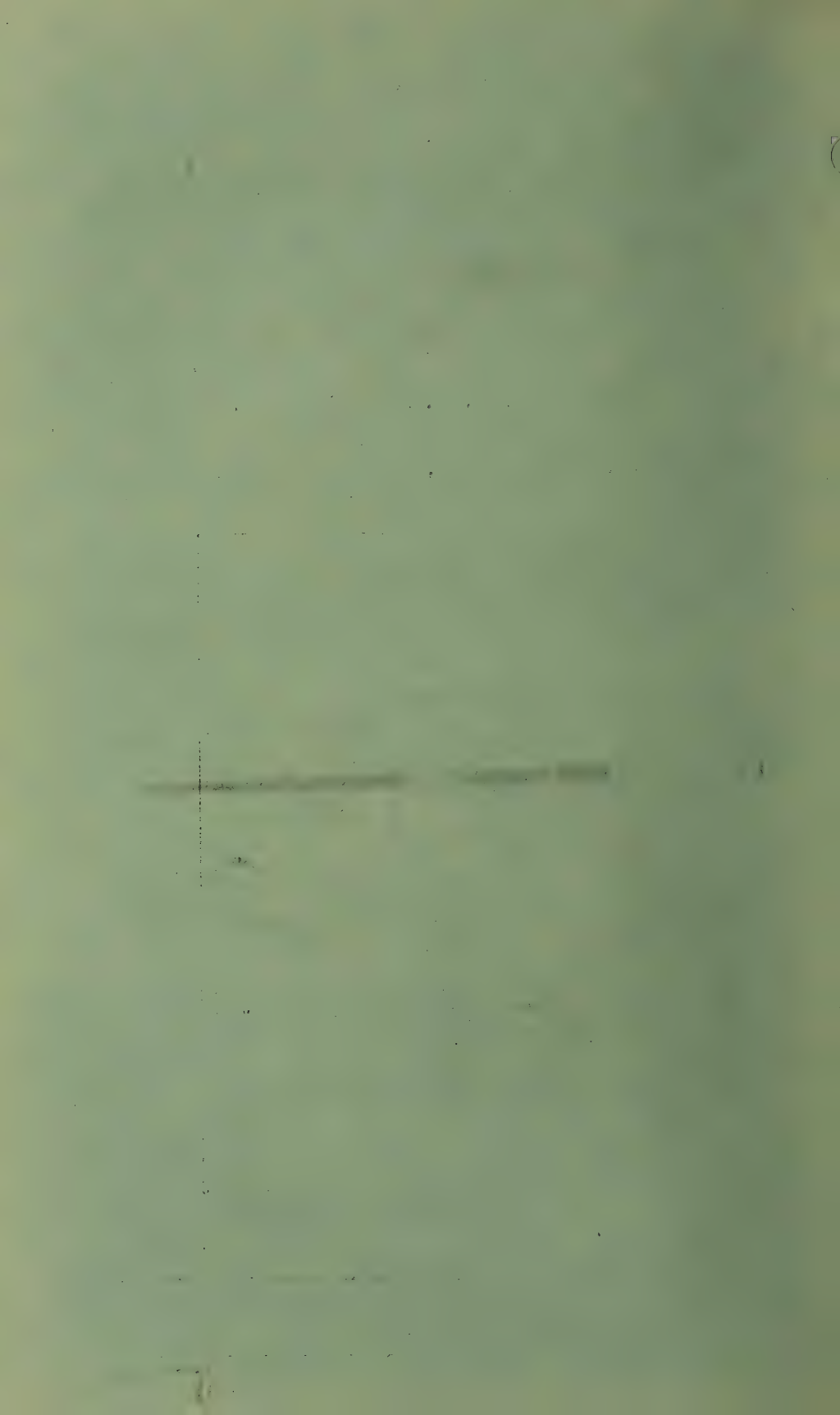
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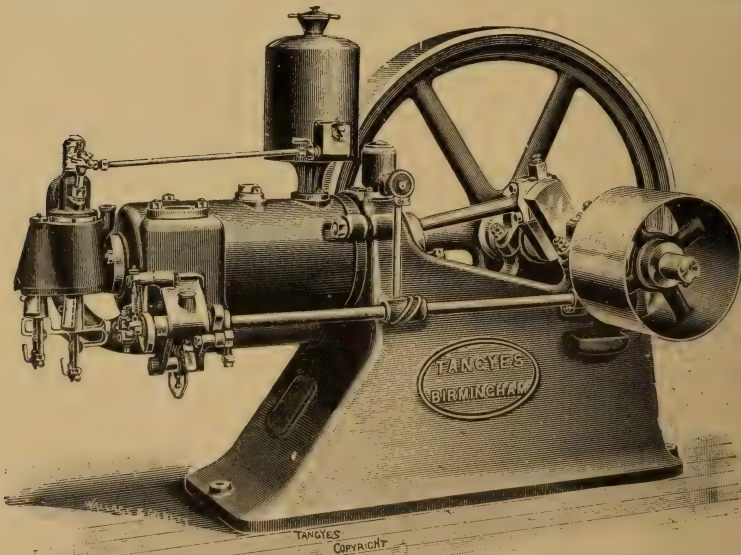
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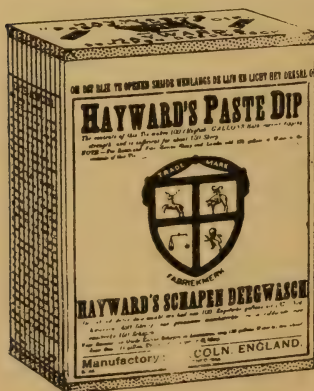
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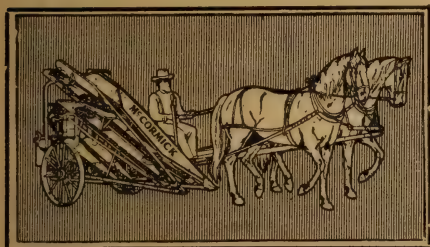
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# THE RHODESIAN AGRICULTURAL JOURNAL

Issued by the Agricultural Department.

EDITED BY L. A. KING-CHURCH.

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VOL. IV.—No. 4.]      APRIL, 1907.      [5s. per annum.

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## Editorial.

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Now that mealies have touched a price which, in comparison with other South African Colonies, seems to indicate about their normal value, the question arises what to grow instead of, or as well as mealies, and how to dispose of any surplus. Mr. Odium in his Agricultural Notes offers some valuable suggestions in answer to these queries. He points out that, from the experience of other maize growing countries, it is more profitable to feed cheap grain to stock and market it in the form of meat, for not only is it less expensive to dispose of in this state, owing to its less bulky nature, but the mistake of constantly cropping the land and disposing of the produce off the farm, without returning anything in the nature of manures is overcome.

Farmers no doubt have realised that they would have to turn their attention sooner or later to these matters, but the uncertainty of a market for any other crops or livestock that they might produce has probably prevented them from launching out on any large scale in producing them. The customs returns afford a good indication of the direction in which their energies should be directed, and their aim should be to produce all necessary supplies

for the home markets, and convert to their own use the constant stream of money annually flowing out of the country for goods which they could supply. As Mr. Odlum points out, bacon and other products of the pig, also all dairy produce, should not figure on the list of imported articles. These two important items in the cost of living, however, cannot be manufactured without the aid of co-operation if they are to compete with the imported article, and here the crux of the whole question comes in. Unless farmers are prepared to support loyally any factories started for the manufacture of bacon failure and disappointment are bound to result in all parties concerned.

Another point which is worthy the attention of farmers is the subject of the cost of production of their crops. By studying this subject, and devising a method of arriving at some reliable data upon the matter, they will be in a better position to judge which are the most paying crops to grow, and what is the most profitable way of marketing them. The article published on this subject will, it is hoped, prove of some value in assisting those who are anxious to fully satisfy themselves as to the result of their year's labours. They may find that the mealie crop, in spite of the lower prices to which they have been accustomed, is still paying them well, and that some other operation on the farm is reducing the net profit. Again, if they take advantage of Mr. Odlum's advice and institute some system of crop rotation, they will be able to determine by some such means as is explained in the article, which rotation is the most profitable. Some of the tables have been left blank, only the various items in the cost of production being suggested, the results are left for those who have the means of obtaining them to fill in, the figures in those tables that are filled in are entirely imaginary. Owing to the article being taken from an American bulletin, it was thought better not to publish the results obtained there, on account of the conditions being very different, and the possibility of their consequently proving misleading.

The opportunity offered to farmers to have their soils analysed by Mr. Cameron will be taken full advantage of by those who realise how greatly the knowledge of the chemist and analyst has assisted the modern farmer in obtaining from the soil the greatest returns from all that

he puts into it, be it seed, labour or manure. Before agriculture had been studied scientifically the farmer knew that in certain cases an application of lime benefited his crops, but beyond that he could give no explanation. Many of the artificial manures now so largely employed would never have come into use but for the co-operation of the chemist with the farmer. Very little is known so far about the soils of Rhodesia, and no one should fail to profit by this opportunity of discovering to what extent the soil is to thank for an extra big, or to blame for an extra small, crop.

The foundation of The South African School of Forestry, a summary of the prospectus of which appears in another part of this Journal, enables students to study this branch of Agriculture in the most practical surroundings. Before this School was started any person desirous of gaining a scientific knowledge on this subject, for application in South Africa, was unable to do so in this sub-continent, the chief Forest Schools being situated either in Europe or America. The high cost of the course of instruction at these forest schools and the somewhat impractical character of their instruction (as regards South Africa), makes the establishment of this School of Forestry doubly valuable.

The opportunity is now available for South Africans to qualify for admission to the Government Forest Departments in South Africa, and other sub-tropical countries, by studying at the only School of Forestry in the Southern Hemisphere.

There can be no doubt of the value of Forestry in South Africa, both from a commercial and agricultural point of view. Our supplies of timber are mostly drawn from the pine forests of Northern Europe and America, and with the constantly increasing demand in the home markets, we cannot expect these supplies to continue for an indefinite period, nor the price to decline to any appreciable amount while our own consumption increases. From an agricultural standpoint the more effective conservation of the rainfall is much assisted by means of plantations of trees, which not only perform this useful function during their growth, but will in time develop into a valuable asset on the farm.



## DATES OF THE AGRICULTURAL SHOWS.

Umtali, May 17th.—Secretary, Horace Freeman, Esq., Umtali.

Gwelo, May 31st.—Secretary, W. J. B. Boggie, Esq., Gwelo.

Bulawayo, June 6th and 7th.—Secretary, E. L. Loosley, Library Buildings, P.O. Box 500, Bulawayo.

Salisbury, June 21st and 22nd.—Secretary, W. H. Williamson, Esq., c/o Messrs. Whitfield and Co., Salisbury.

The Secretary Bulawayo Agricultural Show asks us to mention that he will be very pleased to answer any letters upon any matter connected with the Show.

---

## The Theory of Agriculture.

---

The terms theory and practice are so often misapplied that many agriculturists have come to regard the one as in opposition to the other. There is no better exposition of the relationship existing between theory and practice than that given in the introductory chapter to Johnson's "How Plants Grow," from which the following extensive extracts are made:—

"The object of agriculture is the production of certain plants and certain animals which are employed to feed, clothe and otherwise serve the human race. The first aim, in all cases, is the production of plants.

"Nature has made the most extensive provision for the spontaneous growth of an immense variety of vegetation; but in those climates where civilisation most certainly attains its fullest development, man is obliged to employ art to provide himself with the kinds and quantities of vegetable produce which his necessities or luxuries demand. In this defect, or rather neglect, of nature, agriculture has its origin.

"The art of agriculture consists in certain practices and operations which have gradually grown out of an observation and imitation of the best efforts of nature, or have been hit upon accidentally, or, finally, have been deduced from theory.

"The science of agriculture is the rational theory and systematic exposition of the successful art.

"Strictly considered, the art and science of agriculture are of equal age, and have grown together from the earliest times. Those who first cultivated the soil by digging, planting, manuring, and irrigating had their sufficient reason for every step. In all cases thought goes before work, and the intelligent workman always has a theory upon which his practice is planned. No farm was ever conducted without physiology, chemistry and physics any more than an aqueduct or a railway was ever built without mathematics and mechanics. Every successful farmer is to some extent a scientific man. Let him throw away the knowledge of facts and the knowledge of principles which constitute his science, and he has lost the elements of his success: The farmer without his reasons, his theory, his science, can have no plan; and these wanting, agriculture would be as complete a failure with him as it would be with a man of mere science, destitute of manual, financial, and executive skill.

"Other qualifications being equal, the more advanced and complete the theory of which the farmer is the master, the more successful must be his farming. The more he knows, the more he can do. The more deeply, comprehensively, and clearly he can think, the more economically and advantageously can he work.

"That there is any opposition or conflict between science and art, between theory and practice, is a delusive error. They are as they ever have been, and ever must be in the fullest harmony. If they appear to jar or stand in contradiction, it is because we have something false or incomplete in what we call our science or our art; or else we do not perceive clearly, but are misled by the narrowness and aberrations of our vision. It is often said of a machine that it is good in theory, but failed in practice. This is as untrue as untrue can be. If a machine has failed in practice, it is because it was imperfect in theory. It should be said of such a failure, the machine was good, judged by the best theory known to the inventor, but its incapacity to work demonstrates that the theory had a flaw.

"But, although art and science are thus inseparable, it must not be forgotten that their growth is not altogether parallel. There are facts in art for which science can, as yet, furnish no adequate explanation. Art, though not older than science, grew at first more rapidly in vigour

and in stature. Agriculture was practised hundreds and thousands of years ago with a success that does not compare unfavourably with ours. Nearly all the essential points of modern cultivation were regarded by the Romans before the Christian era. The annals of the Chinese show that their wonderful skill and knowledge were in use at a vastly earlier date.

“So much of science as can be attained through man’s unaided senses reached considerable perfection early in the world’s history. But that part of science which relates to things invisible to the unassisted eye, could not be developed until the telescope and the microscope had been invented, until the increasing experience of man and his improved art had created and made cheap the other inventions by whose aid the mind can penetrate the veil of nature. Art, guided at first by a very crude and imperfectly developed science, has, within a comparatively recent period, multiplied those instruments and means of research whereby science has expanded to her present proportions.

“The progress of agriculture is the joint work of theory and practice. In many departments great advances have been made during the last hundred years; especially is this true in all that relates to implements and machines and to the improvement of domestic animals. It is, however, in just these departments that an improved theory has had sway. More recent is the development of Agriculture in its chemical and physiological aspects. In these directions the present century, or we might almost say the last fifty years, has seen more accomplished than all previous time.

\* \* \* \* \*

“It is the boast of some who affect to glory in the sufficiency of practice and decry theory, that the former is based upon experience, which is the only safe guide. But this is a one-sided view of the matter. Theory is also based on experience, if it be worth the name. The fancies of an ignorant and undisciplined mind are not theory as that term is properly understood. Theory in the strict scientific sense is always a deduction from facts and the best deduction of which the stock of facts in our possession admits. It is, therefore, also the interpretation of facts. It is the expression of the ideas which facts



awaken when submitted to a fertile imagination and well-balanced judgment. A scientific theory is intended for the nearest possible approach to the truth. Theory is confessedly imperfect, because our knowledge of facts is incomplete, our mental insight weak, and our judgment fallible. But the scientific theory which is framed by the contribution of a multitude of earnest thinkers and workers, among whom are likely to be the most gifted intellects and the most skilful hands, is, in these days, to a great extent worthy of the Divine Truth in nature, of which it is the completest human conception and expression.

\* \* \* \* \*

“The farmer deals with the plant, with the soil, with manures. These stand in close relation to each other and to the atmosphere which constantly surrounds and acts upon them. How the plant grows—the conditions under which it flourishes or suffers detriment—the materials of which it is made; the mode of its construction and organisation; how it feeds upon the soil and air; how it serves as food to animals; how the air, soil, plant, and animal stand related to each other in a perpetual round of the most beautiful and wonderful transformations, these are some of the grand questions that come before us; and they are not less interesting to the philosopher or man of culture, than important to the farmer who depends upon their practical solution for his comfort; or to the statesman, who regards them in their bearings upon the weightiest of political considerations.”

\* \* \* \* \*

In this and succeeding articles under the same heading, we propose to note a few of the many interesting facts relating to plant life, which have directly or indirectly, consciously or unconsciously, shaped the methods of the Agriculturist.

Many facts in connection with plant life, while interesting, at first often appear to be without practical application from the agriculturalist's standpoint, but when several of these facts are taken together they aid in the shaping of new methods or explain the reasons for existing ones.

## HOW ROOTS ADVANCE IN THE SOIL.

Roots advance through the soil as the result of one of those ingenious mechanical contrivances with which nature is always surprising us. Below is a diagrammatic representation of the tip of a root-hair. The interior of the hair at *i* is the centre of growth; from this point onward is the cap of the root; behind this point is the body of the root-hair. At the centre of growth new cells are being constantly formed, and as these develop the pressure exerted must result in some movement. The older portion of the root behind the centre of growth

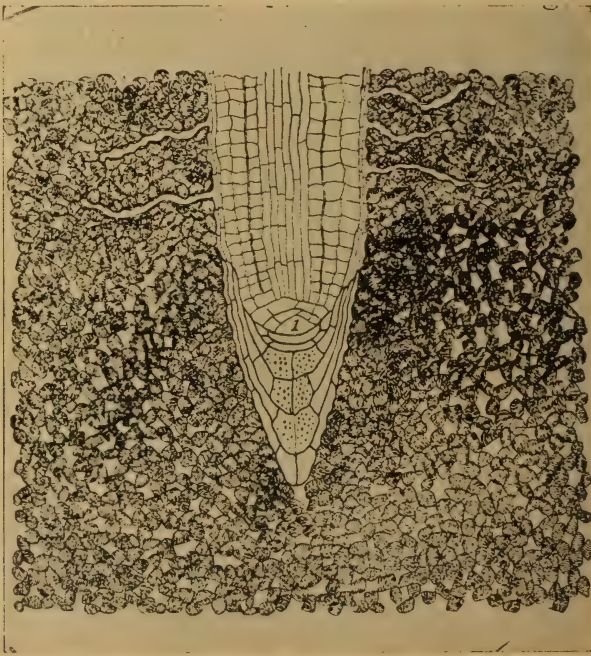


Diagram showing the method by which root-hairs advance through the soil ;  
*i*, centre of growth.—(Adapted from Sachs by King.)

being fixed, the line of least resistance is in the direction of the point, and the new-formed cells are pushed in that direction, and as a consequence the cells just behind the terminal cells are forced through between them and enter the space in the soil that has been opened by the spreading of the terminal cells. The terminal cells do not move forward, but serve as shields during the passage of what are to be the next set of terminal cells. The root behind

continues to enlarge through the division of cells, and the forcing outward of the cells already in contact with the soil. Thus while all the cells are continually exerting a pressure there is no forward movement through the soil, and no friction that would destroy the cells, as there would be if the root were growing from behind and pushing already grown parts through the soil.



Root hairs of Wheat, A, when very young; B, four weeks later (after Sachs).  
Note how the root hairs have died away on the older portion of the roots.

As the root advances, root hairs begin to appear at a short distance back from the point. These root hairs are seldom more than an eighth of an inch long and usually less than 1-100th of an inch in diameter, and may be likened to delicate, irregular and crooked tubes, the irregularity being due to their accommodation to the



spaces between the soil grains. These root hairs are the feeding organs of the roots, and on their numbers largely depends the growth of the plant. These hairs live but a short time, and are constantly dying off on the older portion of the rootlet, while new ones are developing nearer the point. These root hairs come into very close contact with the soil grains around them, and the thin film of water that covers every soil grain spreads out and covers the root hair.

The method by which the moisture in the soil, with the plant food soluble in it, enters the root hairs and reaches the leaves, and from them is in turn transmitted to the growing cells throughout the plant, will be explained at another time, but the point of interest to us is that all the food and water taken from the soil must enter through these hairs. These root hairs excrete vegetable acids that dissolve some of the food in the soil not soluble in water, and thus it is that chemists, in determining the fertility of the soil, use certain weak vegetable acids to render soluble material that the plant could in growing feed upon.

The importance of deep and through tillage becomes at once apparent, for if the soil is composed of hard lumps that the roots cannot easily penetrate, the feeding area of the plant is reduced and the growth restricted, or if there is a hard layer at six inches below the surface, the roots, in that they must, because of the nature of their growing point follow the line of least resistance, spread out instead of entering the sub-soil and consequently but little of the fertility of the sub-soil is available. But more than this, soils with a hard, unbroken sub-soil easily water-log, and a water-logged soil not only prevents the movement of air through the soil, but is as a result of surface evaporation much colder than it would otherwise be. Root hairs must have air in order to develop, and those of land plants cannot grow or perform their function in a water-logged soil.

More than this the root hairs cannot rapidly absorb water and fertility except in a warm soil, and a water-logged soil being cold, their action is restricted, and the growth of the plant checked.

In times of drought the surface layers of the soil are so reduced in moisture that it is difficult for the hairs to find the necessary water or fertility for the growth of the

plant, and, the sub-soil being hard and but few roots in it, the plant is forced to cease growth; if not, restrict its requirements by the dying off of leaves. Under nearly all conditions, deep tillage is then an advantage, the exceptions being where there are no extremes in moisture conditions, and where the surface soil contains an abundance of plant food, or where the soil is naturally porous.

Where the sub-soil is sour or contains elements injurious to plant life it may be bad policy, as far as the immediate result is concerned, to bring it to the surface while burying the better surface soil, although it may be good policy to stir it without bringing it to the surface and thus secure the necessary drainage with its attendant results, or for the purpose of, in times of drought, having an available water supply for the plants.

### HOW PLANTS BREATHE.

The leaves may be described as the lungs of the plant, and in the same way that these delicate organs are protected in the animal, the delicate chlorophyll cells per-

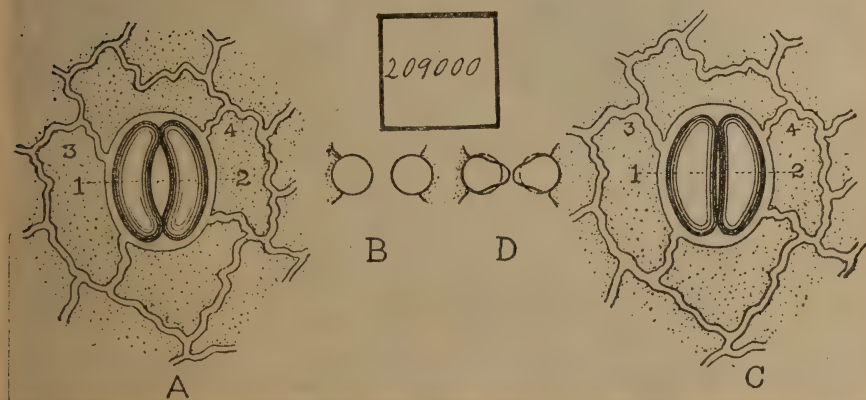


Diagram showing the mechanical action of guard cells in opening and closing breathing pores. A, breathing pores open; B, cross-section of A through 1-2; C and D, corresponding views of the breathing pores when closed. The square shows the area of under side of leaf, containing an average of 209,000 breathing pores.—(After King in "Irrigation and Drainage.")

forming the same functions for the plant, are in the interior of the leaf and protected by a heavy covering, the epidermis of the leaf. The greater the extremes from which these cells must be protected, the better

equipped the covering is for that purpose, as will be observed by comparing the leaves of many desert plants with those having their living in humid regions.

The plant must be supplied with air, the chief reason for this being that the carbon of the plant is derived almost wholly from the carbonic acid gas in the atmosphere, and the greater portion of the dry weight of plants is made up of products such as sugar, starch, cellulose, etc., that are built up on a carbon base.

Boussingault found that an acre of clover, weighing 4,500 lbs., contained 1,680 lbs. of carbon, and states that if the clover plants had decomposed all the carbonic acid gas breathed by them, that it would have been necessary for this acre of clover to have breathed 152,600,000 cubic feet of air. Inasmuch as the air is never fully freed of carbon a much larger quantity of air must have entered the leaves of the plants.

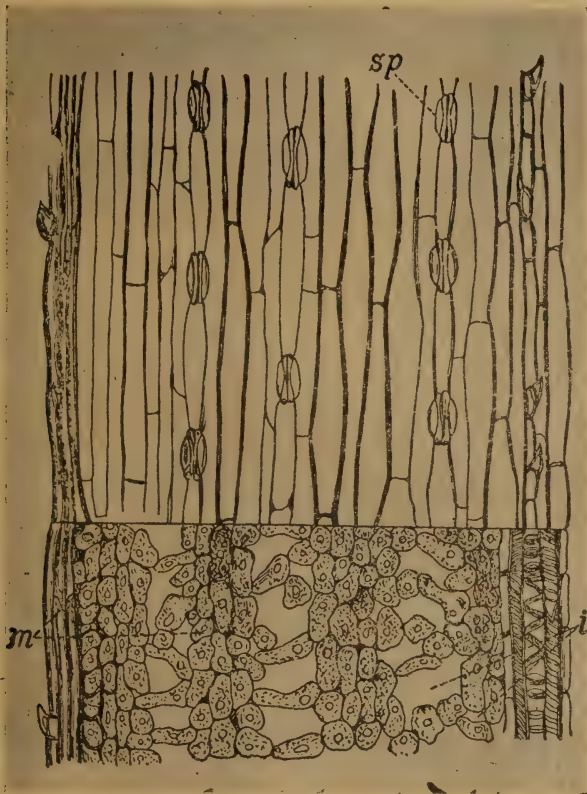
The air passing through the leaves carries away with it some of the water of the plant, and with a free and unrestricted circulation of air through the leaves, it is evident that moisture would be lost, more particularly in dry weather, much faster than the root hairs could take it up from a half-dry soil, and that as a consequence the evaporation area would soon be reduced through the death of many leaves, or the plant totally destroyed.

Air enters the leaf through the small breathing pores or stomata of which there may be several hundred thousand to the square inch of surface. Twenty-one per cent. of the surface of a maize leaf is composed of these breathing pores, or what may be called the nostrils of the plant. The entrance to these pores is protected by an arrangement of cells, quite as ingenious as the arrangement of those in the tip of the root hair. These cells are of such construction that when filled with water they mechanically open the entrance to the pore and permit of a more rapid movement of air, but when the moisture content of the leaf is reduced, they being among the first cells to lose water, must relax, and in doing so they reduce the size of the opening and restrict the circulation of air, thus reducing evaporation.

It will be observed that unless the plant is abundantly supplied with water that the respiratory processes are restricted, the amount of carbon assimilated consequently



reduced and the growth of the plant checked. Except where intelligently irrigated, plants are seldom supplied with a sufficiently regular supply of water to permit of the maximum growth. The majority of crops are dependent



Structure of Barley Leaf (after Sorauer). The upper portion of illustration represents the surface of the leaf, the points marked *sp* being the breathing pores. The lower portion of the illustration represents a cross section of the leaf, *m* being the chlorophyll cells and *i* the respiratory chambers.

upon moisture directly derived from rains that are beyond our control, and the only way by which we may aid plants in meeting their moisture requirements is by storing that water in the soil by means of deep and through tillage, and its conservation by means of frequent surface cultivations to prevent excessive evaporation.

The other functions of water will be described at another time.

## **Agricultural Notes.**

---

BY G. M. ODLUM.

As the result of increased acreage and a generally favourable season, the maize crop is the largest yet grown in the country. The crop of 1905 was not sufficient for the requirements of the country, and as a result some £20,000 worth of mealies were imported during the early part of 1906. The 1906 crop was equal to all local demands, and it is not yet certain but that there is a small surplus; the large increase in the 1907 crop makes it certain that we shall now have a large surplus which we must feed or export. Kimberley has always been regarded as our natural market, but with the crops in the South reported as above the average, it is evident that we cannot expect high prices to rule in the Southern markets.

There is, however, one factor that will prevent the surplus from being as large as it otherwise would have been, and that is the falling off in native trading. The settlement of the farms near the towns and railways has gradually forced the majority of traders back into the districts where transportation charges consume the profits in times of low markets, and, at the same time, the competition among traders has resulted in the native being paid a price that, even under the higher prices ruling last year, left the trader little if any profit. The native having become accustomed to the high prices will be slow to part with his grain at the price that traders can now afford to pay, and the result will be that a far less amount of native grain will appear on the market than in the past, unless the holding of grain by farmers temporarily forces up the price.

Now that the farmers have demonstrated that they can supply the country with grain at a reasonable price, the native grain will become more and more a neglectable factor, and while at first the native may regard the conditions as a bit astonishing, many of them will soon learn that the only way to secure the necessary money is to work for it, which will be for the ultimate good of the native as well as beneficial to the farmer who is often handicapped by shortage of labour.

It is not to be supposed that our farmers will ever want to reduce the acreage of any crop, particularly one so well adapted to the country as maize. In a new country the acreage of the staple crops must constantly increase, and it may be regarded as fairly certain that the production of grain will increase with each succeeding year, so long as the market returns a fair margin of profit. The development of mining and kindred industries will increase the consumption, but with the rapid development of old and new farms, it is evident that the farmer can grow more maize than the raw grain and meal requirements of the country demand. What then is to be done with the surplus?

---

Every maize growing country has in the end become a pork producing country. The pig appears to be the best medium for the profitable marketing of the mealie.

South Africa has been importing some three-quarters of a million worth of pork products, and during last year Rhodesia imported some 300,000 lbs. weight of ham and bacon, and in addition very considerable quantities of lard, sausage and brawn. Is there any reason why this importation should continue, and would it not be possible for Rhodesia to supply itself with these items and even in time send a surplus to the sister colonies?

Some two years ago it was proposed that the farmers co-operate in the importation of breeding pigs and in the establishment of a ham and bacon factory. The proposition received a fair measure of support, but in the end was held in abeyance because many believed that the price of mealies would remain at a point where it would be unprofitable to feed pigs. But the slump in mealies then anticipated by the few is now a condition, not a supposition.

---

With maize at 10s. a bag on the farm, what is the cost of producing pork? In other countries pigs fed exclusively on maize with a farm value of 10s. cost 3d. a lb. live weight, but if the market value of maize in the towns is but 10s., the value on the farm after deducting transport, sacking and selling commission is sufficiently low to permit of pork being made at a cost of 2d. a lb., or in other words when mealies have a market



value of 10s. a bag the farmer can double the real or farm value by selling live pigs at 4d. a lb. But the feeding of pigs on one food only is the most expensive way of producing flesh, and much cheaper pork can be produced by mixed feeding.

If mealies are worth 13s. on the market, and the pigs are fed the grain in combination with pasturage on native beans, the cost of growing the beans being taken at £1 an acre, and the results being taken as equal to American results, the cost of producing pork should be about 2.16d. a lb. That means that the careful feeder should find it possible to make an additional profit of 85 per cent. by turning 13s. grain (town price) into fourpenny pork. In connection with a dairy and the feeding of skimmed milk, the results secured from the mixed feeding are much better and the cost of production less. Of course we are presuming that our farmers will be as careful feeders as those of other countries, and that they will secure the same results, but, without regarding the figures as more than suggestions, it at least indicates a way whereby the farmer can increase his acreage of maize and at the same time find a profitable market for the surplus.

Fourpence a pound live weight is regarded as a price that a local ham and bacon factory could afford to pay for pigs and still make a fair return for the shareholders.

---

The better price obtained by marketing farm crops through the medium of animals is not the only reason that stock feeding is popular among the farmers of all countries. The continued sale off the farm of any grain or forage crop soon results in a loss of fertility, and the land in time ceases to grow profitable crops. But the same if not greater monetary returns can be secured, by turning a small proportion of that fertility into meat, and keeping the remainder on the farm in the form of manure. At the same time the cost of marketing the higher priced meat is much less than the cost of handling the cheaper heavier grain.

---

But where are the pigs, is the first question that will be asked; for the average long-snouted, cat-hammed, roach backed racing pig, so common in this country, while un-

doubtedly possessed of an excellent appetite, has none of the other qualifications of a profitable feeder. He is the result of in-breeding, and the starvation of the young pigs during their formative period. If pork production is to attain to proportions justifying a factory, there must be an importation of a large number of breeding pigs, and to do this some co-operative movement is necessary.

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The growing of Kafir beans and other leguminous crops for the feeding of pigs would fill what is now a blank in our cultural system, by the introduction of the important nitrogen gathering plants into our rotation. Maize after maize on our dry lands, and maize after oats or wheat, followed by oats or wheat again, on our irrigated lands, cannot continue for any extensive period without the lands being so reduced in fertility that profitable culture becomes impossible. Many have realised the importance of the legumes, but not seeing any way of turning them into an immediate profit, have postponed the introduction of them into their farm system, and thus hastened the day of reckoning, but when it is realised that pasturage on leguminous crops, in connection with the feeding of maize, balances the ration and produces better pork at a less cost, it is evident that extensive pig feeding will, by changing our farm system, have a secondary result, quite as important as the disposal of the surplus grain crop. Beggarweed is a valuable crop for both the improvement of land and pig feeding.

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One of the most easily grown crops, but for which we have a very limited market at the present time, is sweet-potatoes. This is a valuable crop for pigs when supplemented by a grain ration. The pigs can themselves harvest the crop during the winter months when green food is less plentiful.

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The profitable prices received for maize in the past has not made the diversification of crops an important matter from the financial standpoint, and it has been the best policy for the beginner to concentrate his energies on the grain crop. But that day is nearing its end. The

diversification of crops in Rhodesia is not an easy matter, for the production of potatoes, forage, and manna is now equal to the demand. Cotton has been proved to be a failure in the now settled districts, and such experimental crops as rubber, ramie, castor-beans, and sisal hemp are best left alone by the individual farmer until the farming companies have demonstrated the advantages to be derived from their culture.

There is, however, an increasing demand for monkey or ground nuts, and for beans, and it is believed that both can be grown at a profit. Those now testing these crops will be in a position to supply more definite information at the end of this season.

There is a splendid market for wheat, and the importation of flour is one of the numerous leaks that should be stopped. Unfortunately wheat growing at the present time is confined to farms where irrigation is possible.

Tobacco growing offers a practically unlimited field to the man who has the right soil and will trouble to produce nothing but the best, but it is not a crop that the beginner can undertake on an extensive scale without one or two experimental years.

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One of the minor industries that suggests itself is the manufacture of syrup from sorghum cane. Sorghum is as easily grown as Kafir corn, and the number of barrels of excellent syrup obtainable from an acre of this crop would surprise the uninitiated. The machinery requirements for forty acres of sorghum are not great, and the syrup can be sold at a low price and still return a profit. The Kafir has a sweet tooth, and it is probable that he would satisfy it if a cheap syrup were offered him. Of course such an industry is only for a few and cannot become general.

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Several Matabeleland farmers are now selling from 800 to 1,000 lbs. of butter per month. The trouble with Rhodesian butter is not the quality, but the fact that it is not obtainable in quantities during the winter months. This necessitates the importation of Australian and Argentine butter, and the merchant, being certain of his supply from that source, ends up by stocking it through-



out the year. If there were some place where summer butter could be held until the winter months, such as in the cold storage rooms of a ham and bacon factory, the supply could be maintained throughout the year, and local butter could command the market.

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The spread of maize rust is a matter for consideration. As before stated the only way of combating this disease is to breed rust resistant strains of one or all the varieties of maize. A healthy plant growing in the worst portion of an infected field probably has a high degree of resistance, and should be selected as a parent plant. But inasmuch as under natural conditions this plant may have been crossed with a badly rusted plant, and because many plants are not highly prepotent, a large selection of parent plants should be made at the start. Each parent ear should be planted by itself where there is the best chance of its rusting, and the parent ears for the next year's selection chosen from those plots where the plants as a whole appear the most highly resistant. The following year some of the plants in the best plots should be self-fertilised for the purpose of fixing the character as far as possible, but inasmuch as maize loses vigour when self-fertilised, the process should not be continued, and the next year cross fertilisation should be insured by the detasseling of alternate rows in the plot grown from the seed of the self-fertilised ear, and the parent ears saved from the best detasseled plants. Time and judicious selection should result in the establishment of a resistant strain. But the seed plants should be given every opportunity to rust even if it is necessary to spread the rust spores through the field by means of diseased plants brought in from other fields.

Because a field has escaped the rust it should not be taken as an indication that the variety in that field is resistant. Often two weeks difference in planting time makes, for that season, all the difference between two fields of the same variety growing side by side. Unfavourable weather at certain stages of growth apparently induces rust while older or younger fields escape.

There is no completely rust resistant variety, although some varieties appear at times more resistant than others. The puzzling feature of this is that the variety that

appears the most resistant in one district is apparently the most susceptible in others, and varieties that have been apparently resistant for two years often fail the third season.

Rust resistance cannot be then built up on the basis of varieties alone, or the saving of seed from fields that have escaped infection. We must start with the individual plant, and the greater the infection resisted by that plant the sooner we have the opportunity of securing a resistant strain.

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## Maize Breeding.

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We have often referred to the importance of maize breeding and to the grain resulting from the selection of prepotent pedigree strains, but the following description of methods used in maize breeding, written as it is by one of the largest commercial maize growers in Illinois, cannot but be of interest to those engaged in the improvement of our local varieties of maize :—

### BREEDING METHODS.

There are plants in nearly every corn field that produce at the rate of over 100 bushels per acre, and others that produce at the rate of 50 bushels per acre, and so on down until we come to the barren stalk which produces nothing at all.

Why the difference? It is the inherent tendency of each plant to produce just what it does. No one can tell what the inherent tendency may be by examining an ear before planting. How then can the large producing ears be identified? They must be tested.

We have tested over 20,000 apparently fine ears in "single rows" to ascertain what they would produce.

The plots of ground or breeding blocks where these tests are made are so situated as to prevent the pollen of other corn mixing with these breeding ears. Each mother ear is planted in a single row and a record kept of its performance as follows:—

The germination is taken. The number of stalks and hills are counted before harvesting. The product is harvested, the ears counted and weighed, and the yield

per acre is accurately figured. (If each hill produced one pound the rate of yield would be  $50\frac{1}{2}$  bushels per acre. If two pounds the rate would be 101 bushels, etc.) The average weight of ears is obtained; also the number of ears produced per stalk. Breeding ears for the next year are selected only from the eight or ten rows giving the greatest yield and largest average ear, combined with other good qualities described later.

This system if carried only to this point gives but one good side to a pedigree.

By the method above described we have found mother ears that gave magnificent yields, but to ensure success this characteristic yield must be fixed, so that it will be transmitted, or passed on, to succeeding generations. Then we can expect with some certainty that ears produced by these champion yielders will in turn give large yields.

To do this it is necessary to control the influence exerted by both parents. This is, the mother ear must be a champion and the pollen which fertilises her product must be from champion rows. In planting the blocks described above, of 80 to 100 rows, only one-half of the seed is used, the remaining one-half is left on the cob. Now of these 80 to 100 rows only ten of the largest yielders are selected as champions. By our records we can, of course, identify the ears from which these champion rows are planted. Taking the remaining one-half of these champion ears the next year we again plant them in single rows in what we call "Champion Blocks." In these blocks all of the even rows are completely detasseled so as to receive pollen only from the odd rows. The detasseling is performed to prevent self-fertilisation or fertilisation from related plants.

## THE PREVENTION OF INBREEDING SELF-FERTILISATION OR CROSSING BETWEEN RELATED PLANTS.

In regard to this feature of breeding, a word of explanation is not out of place. Corn is a wind or open fertilised plant. That is, the pollen from one stock blows to another, falling on the silks and fertilising the grain there produced. This is a natural way for it to fertilise. By exhaustive experiments it has been proven that if the



pollen from a certain stalk fertilises the ear produced on that stalk, the inbred seed resulting is impaired in vigour and producing power, giving a much decreased yield. This occurrence it is impossible to prevent unless the stalk on which the breeding ear is produced is detasseled before the pollen flies from it. Breeding ears are selected only from the detasseled plants; ears from all other plants are discarded.

The sire or fertilising plant is not completely controlled even as yet. This is successfully done only by hand pollination. The young "shoots" of the detasseled plants are covered with bags before any silks appear and the tassels of the tasseled rows are likewise covered before any pollen is ripe. Then the pollen from fine individual sire plants is used to fertilise ears of the detasseled plants, and a record is kept of all these individual "matings." Only one sire is used on each ear. Finally the large ears that have been fertilised from good sires (a plant producing a fine large ear) are planted in the breeding blocks the next year.

This completes the good pedigree on both sides.

The seed for the multiplying or increase plots is selected from the detasseled champion rows of these breeding blocks.

Breeding ears are selected only from stalks standing at harvest time. The "down corn" is all rejected. The ears produced on standing stalks are gathered separate, and only these are used for breeding purposes. The percentage of standing corn of the entire row is recorded. If this percentage is low the entire row is rejected.

### THE PLACEMENT OF EARS.

If any ears occur too high or too low for convenient shucking they are discarded. If an entire row shows such an abnormal tendency, it is discarded in full.

### GROWTH, FOLIAGE, STALK.

Notes are taken through the growing season on the vigour with which the corn starts and grows; upon the amount and quality of its foliage; and upon the construction of the stalk. If insufficient foliage, weakness of

growth or improper construction of stalks, show abnormally in a row, no breeding ears are selected from it.

The breeding corn for each succeeding year must be selected from one of the eight or ten champion yielding rows giving the greatest amount of corn per stalk. It is selected only from stalks standing up at harvest time and from rows of which the per cent. of standing corn is the very highest. It cannot come from a row of insufficient vigour in germination, or deficient in vigour of growth, foliage or construction of stalks, nor from a row producing an abnormal number of suckers. It is selected only from the detasseled plants of these champion rows.

All of these qualifications must be met. The strain of corn failing in any of these qualities is definitely rejected.

The valuable strains that have "made good" in breeding blocks are propagated in the multiplying plots for increasing the amount of seed for use in the general fields. These plots range from two to fifteen acres in size, each plot representing a single family of corn that has annually proven its utility through the rigid tests of the breeding blocks. But these strains or families must again prove their merit in the multiplying fields where several plots are in competition before they are selected as seed for the general fields from which our supply of seed corn is gathered.

In this way, and only in this way, it is possible to attain the best results in breeding corn—to individualise the strain and propagate it throughout its existence as seed with a traceable pedigree without mixture after its qualities are proven in the breeding block.

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Maize exhibitors are referred to the *Agricultural Journal* of August, 1906, for information regarding the system of judging and the use of the score card.

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Schoolmasters are requested to send pupils' exhibits to the nearest Civil Commissioner at least one week before the date of the nearest Show.

## Notes on Citrus Culture.

(Continued.)

By R. McILWAINE, M.A., LL.B.

### VI. PRUNING OF CITRUS TREES.

It is a very common belief that Citrus trees require no pruning. Their natural habit is to assume a shapely appearance, but nevertheless a certain amount of pruning is beneficial to the orange and essential to the lemon.

The orange tree has a tendency to send out long irregular shoots during the period of its early growth; these should be cut back in order to ensure the balance and symmetry of the tree. The interior of the orange tree is a mere framework for the support of the fruit which is borne on the branchlets on the exterior of the tree. In order to ensure the free circulation of air and remove, as far as possible, breeding places of insect pests and disease, all decayed and unnecessary wood should be carefully thinned out.

In some parts it is considered a good practice to preserve all the lower branches on Citrus trees. When this is done a compact mass of foliage lies on the ground, there is little access of air and no direct sunlight, a condition most favourable to the dreaded collar-rot. On the other hand, some growers believe in an umbrella shaped tree with a long bare stem. Under this system there is a considerable risk of sunburn of the stem, and, further, the baking rays of the sun are very trying for the tender surface rootlets which are found in great abundance around the tree. The method recommended for this country consists in leaving all the branches on the main stem for the first year or so, when the want of air and sunlight is not so much marked. Thereafter as the branches expand, those near the ground can be removed gradually until a condition is arrived at when the air circulates freely under the tree, and the main stem is only exposed to the direct rays of the sun for a few hours in the morning and evening.

The lemon differs considerably from the orange in its habit of growth, and considerable pruning is necessary in order to secure profitable returns. The lemon is disposed to send out long straggling shoots, and to bear fruit



on inaccessible wind-swept and sun-burnt branches. Early pruning should therefore be directed to forming a number of strong spreading branches low down on the stem, these will in their turn throw out an abundance of laterals on which the fruit will be borne. When a low spreading tree has been thus formed by early pruning subsequent attention should be confined to cutting back all straggling growth and encouraging the production of fruit-bearing laterals. These remarks are of special application to the highly developed varieties of cultivated lemons. I have, however, seen the same principles applied to the Mazoe species with very satisfactory results.

## VII. VARIETIES.

Californian experience has pronounced entirely in favour of the Washington Navel variety of orange, and many old trees have been budded over to this kind. In Florida, on the other hand, the Navel is regarded as a shy bearer, and is not looked on with special favour. In Florida a wide range of varieties are grown, the selection depending to a great degree on climatic conditions and individual tastes.

Until a comparatively recent date, growers in South Africa confined their efforts chiefly to seedlings, but within the last few years intelligent attention has been given to improved varieties, and although no rules can be laid down which would apply to the widely diversified conditions of Southern Africa, encouraging success has been attained with the Washington Navel, Valencia Late, Mediterranean Sweet, Jaffa and Old Cape, and I know of at least one grower who has been very successful with the Homasassa and the Maltese and St. Michael Blood Varieties. Personally I have had excellent results from the Washington Navel, Jaffa and Mediterranean Sweet. The fruit of the latter is excellent, but the tree has such a marked tendency to overbear that in its early years there should be a liberal thinning-out of fruit to prevent the dwarfing, if not the death, of the tree.

The mandarin family, popularly known in South Africa as naartje, is chiefly represented in a few varieties which owe their origin to Cape and Natal seedling naartjes.

The lemon most familiar to local residents is the Mazoe species. It is still a matter of conjecture how it was originally introduced into this country. The manner in which it grows and holds its own under adverse natural conditions has led many to believe that the tree is indigenous to the country. The evidence of experts is against this assumption. In Florida several Citrus varieties are found growing under very similar natural conditions, yet it has been clearly established that they all owe their introduction to the early Spanish settlers.

The Citrus family is of Eastern origin, its original *habitat* being probably the Indo-China Peninsula.

The Arabs penetrated far into the interior of India, where they found the Citrus family held in high esteem. They took it westwards, and to them the credit is due for its introduction to Europe and the Mediterranean coasts. There is good reason to believe that the expeditions which came to this country in the search for gold were fitted out on the Arabian or neighbouring coasts. It does not then appear unreasonable to assume that the introduction of the Citrus fruit, now known as the Mazoe lemon, is to be attributed to those seekers for gold.

From the culinary point of view the Mazoe lemon is excellent, but its poor curing and keeping qualities renders it almost valueless for commercial purposes.

The Villa Franca, Genoa, Lisbon and Eureka varieties are all excellent. My experience with the latter is that, although a very good lemon, its foliage is so scanty that the stems and fruit do not receive sufficient protection from the sun.

Until lemon-growing has been attempted on commercial lines, it would be superfluous to deal with curing, which enables the grower to hold the fruit for any time up to six months. It may not, however, be out of place to state that from the moment lemons begin to colour on the tree they lose their juiciness until pulled. When, therefore, the first yellow tinge is observed, they should be cut, not pulled off, and wrapped singly in paper. If they are then kept in a cool, dark, but well ventilated place—not draughty—they will assume a rich lemon colour, the rind will become thin and elastic, and the juice will increase in quantity.

## The Soils of Rhodesia.

By J. CAMERON.

In the first place the class of rock from which a soil has been derived has to be considered, and it is evident that in Rhodesia the Ingenite order of rock formation predominates over wide areas—The Granites, Felstones and Schists.

Large areas, moreover, are composed from Derivative rocks—the Banded Ironstones, Conglomerates, Sandstones, etc.

Although a soil is not often and not necessarily derived only from one kind of rock, yet the class of rock present in the locality generally provides the greater part of the mass, and hence has great influence on its character.

Rocks containing Felspar, Apatite, Mica, Kaolin, yield the most fertile soils. Calcareous schists and banded ironstone also give fertile soils.

All such rocks and their derivatives are present in Rhodesia, but whether or not a soil is actually fertile depends, even although derived from the best class of rock, on a great variety of circumstances and conditions such as rainfall, sub-soil, texture, etc.

The term soil when used in connection with agriculture denotes the upper surface layer comprising the depth turned over by the plough.

It is a feature common to soils derived directly from the primitive rocks that they bear a close relation to the sub-soil lying immediately beneath them. Indeed the upper layer is merely the same material after having undergone amelioration through exposure to the air, the action of organisms and the accumulation of animal and vegetable matter.

The same thing holds true with Conglomerate, Sandstone, and Banded Ironstone soils, where they are in large masses.

It is only in the later sedimentary deposits that the sub-soil occasionally belongs to a different order of rock formation.

It is to be noted that the process of soil formation is going on now, and has been continuing from an indefinite geological period in the past. In fact soils as we now find them owe the greater part of their bulk to the grains of



rock that have resisted the effects of dissolving forces. This means that all soils have suffered a greater loss of those substances which become soluble and available for plant life than they have of those that are insoluble and of no use to plants.

There are soils in this country overlying Calcareous schists, and even derived from them, yet at the same time are deficient in lime. In these particular circumstances what is now left and which composes the soil is mostly silica, or quartz together with the gradual accretion of insignificant quantities of iron and alumina and other bodies—what would be called the impurities of the original rock—all the lime having been dissolved out as soluble carbonate.

There are often red soils derived from schists formed after this manner, but such soils are not to be confused with the red soils derived from banded ironstone inasmuch as from having different histories in their formation and composition their properties will also differ, only the colour being the same.

An examination of the sub-soil generally gives an indication, casting some light on the origin of such soils.

Besides soils that are formed immediately over the underlying rock, there are others that have their materials carried a shorter or longer distance by water. The flow of water being towards the hollows, the disintegrated grains are carried along and deposited as the rate of flow diminishes, this being carried on until hollows are filled up more or less to a level.

Much of the soil cultivated in this country has been formed in this manner, and is largely composed of silt eliminated from soil that has been already formed at a higher level. Vlei soils are thus made, and they partake of the character of the soil and rock in the locality.

Alluvial soils thus formed have their components drawn from a wider area, and perhaps many times shifted from a higher to a lower level. Whether alluvial soils are of coarse or of fine material depends on the rate of flow of the water. Where the flow is rapid little soil will be formed, but much will be shifted and it will be deposited in more level spaces, often covering large areas with highly fertile soil.

By considering soil to be disintegrated and pulverised rock mixed with organic matter the physical and chemical

properties relating to it must be jointly considered in order to determine its agricultural worth.

The chief properties to be considered are the weight, colour, the size, form and arrangement of the soil particles, the relation of the soil to water and heat.

In making an examination of a sample of soil with the view of estimating its farming possibilities, it is of the highest importance to make a close study of the rock particles, as by this means some idea is obtained concerning the combinations in which Phosphoric Acid, Lime, Potash, Iron and Magnesia exist therein. All these essentials for making a fertile soil exist in the original rock in certain definite combinations, some of which are in a form that they are not available as plant food—such as phosphoric acid when in combination with alumina, or with iron. Potash locked up in felspar is also not in a condition immediately available for plant life. But this distinction a chemical analysis of a soil alone does not show; it only gives the total amount of each substance present, including all the combinations.

The size of soil particles varies from those hardly visible with the microscope to grains and fragments of rock. The mixture of the various sized particles is a mechanical one, and in all soils there is a predominance of one grade assigning the character.

When there is a large proportion of very fine matter the soil is termed heavy clay, and when medium sized particles are most abundant the soil is sandy—fine or medium, as the case may be. It is all the different grades of sand silt and clay put together that make up a soil.

The term sand when used in describing a soil does not necessarily mean quartz sand or a sand merely composed of silica. It is the size of the grains that characterises a soil, but the composition of such grains may be calcareous or disintegrated particles of other rocks. The same remarks apply to clay. Those soils which contain a large amount of finely divided matter are termed clayey because they behave like clay; but this finely divided matter may be silica or any other finely divided body but not necessarily combinations of alumina.

When comparing the amounts of plant food in different soils it is important to consider their weights. Sandy soils weigh heaviest, and soils with large amounts

of vegetable matter are lightest, such as peaty soils. A large percentage in a light-weighting soil may yet be less in total amount than a much less percentage in a soil that weighs heavier.

Clay soils weigh less per cubic foot than sandy soils.

It is of the highest importance, however, to make a separation as far as possible of a sample of soil into the different grades of sand, silt and clay. It is found that by far the greater amount of available plant food is associated with the finer particles, that is the clay. Thus a soil containing a large percentage of clay possesses greater crop-growing powers than a soil composed merely of fine sand.

But some of the finest and richest of our clays, the red clays and also calcareous soils, would be unworkable and impracticable for cultivation were the highly attenuated particles existing as separate and distinct bodies. When seen through the microscope after having been sifted through a fine sieve, even the smallest particles are found to be aggregates—a bundle of different particles attracted together and acting as one body. Further separation can be made by rubbing up with water, and a good deal will remain in suspension for a longer or shorter time.

But all clays do not possess this property of aggregation or flocculation of the finer particles, and consequently such clays are impracticable for cultivation. They become plastic when wet, and on drying become hard like a brick.

Clays which contain iron oxides in combination with alumina, seem possessed of this property of aggregation and also all clay soils containing lime.

Thus such soils are more equivalent to sandy soils in so far as their working is concerned, while they are at the same time richer in material carrying the elements of fertility.

It is the size of the soil particles, moreover, that determines, to a large extent, the power of a soil for fixing and holding in combination the soluble substances essential to fertility and thus saving them from being washed out by excess of water.

A coarse sand has very little of this power, and hence never acquires a store of plant food.



While the power of holding these salts is in proportion to the size of the particles, yet it is the clays having a certain amount of silicate of alumina that possess this property in the highest degree.

The distribution as well as the size of soil particles has a great deal to do with the absorption and retention of water. An even distribution of the different grades throughout the mass is the most favourable arrangement, and this is attained by frequent cultivation.

There is a pronounced tendency throughout the soils of this country leading to an accumulation of the coarser grains on the first two or perhaps three inches at the surface.

Besides heavy rains washing the finer materials down through the soil another contributory cause is the action of ants and termites. These soil-workers bring large amounts of sand grains to the surface, and while such movements are no doubt ultimately beneficial the immediate effect is unfavourable to the fertility of the surface part of the soil.

In this respect the action of white ants and all ants differs from that of earth worms. The soil brought up by earth worms goes through a titrating process and is ejected in the worm casts in a finely divided state as humus material.

But the ants bring up much coarser grains and without such an ameliorating process, nor are their workings so evenly distributed. Most of the organic matter which would otherwise promote an even fertility is collected into heaps which are accumulated at the expense of the area surrounding—perhaps a distance of fifty feet or more.

No doubt these heaps do contain a large amount of fertilising matter, and when dug out and spread over the surface they have a manurial effect corresponding to the quality of the soil and materials from which they are formed, but very little manurial value attaches to coarse sand and dead bush.

Samples of soil for analytical purposes should be taken at some distance away from ant heaps.

Soils derived directly from the granite are particularly liable to be influenced by heavy rains and other agencies. The felspar weathers more readily than the other constituent, and as it gets very finely disintegrated it gets

washed down through the coarser particles. There is often an accumulation of clayey material near granite formations, lying at a short distance from the surface, while the upper soil may be of a sandy nature more or less coarse.

If sufficiently fine this deposition of mixed sand and clay makes a highly fertile soil, and one that stands drought well. But sometimes the upper soil is too coarse and hence the soil suffers from leaching until there is little but the quartz left. Often these soils, however, make good pasture land.

It is no doubt largely due to the foregoing agencies that the grasses are so coarse over large areas on the raw veld. The finer grasses have the greater part of their root system spread out near the surface, and when the conditions existing in that part of the soil are unfavourable these finer grasses have to give place to stronger and more deeply rooting varieties. Whenever the veld is ploughed the character of the grasses is at once altered to the better.

Consolidation of the surface attended with the retention of the finer material near the top is also brought about by pasturing the land with stock.

The capacity for drawing water towards the surface during drought wholly depends on the size of the soil grains and their even distribution. This capillary power extends to several feet, and its efficiency is at its best when the soil and sub-soil are composed of small sized material and evenly distributed throughout.

A bar of clean sand or gravel lying within a foot or two of the surface may be very good for drainage, but it breaks the continuity of the capillary tubes and practically stops the supply of water coming from below towards the surface.

Thus the character of the subsoil has to be inquired into in order to ascertain the drought resisting qualities of a soil.

A distinction is to be made between soils carrying a verdure that is merely coarse and those carrying grasses that are not only coarse but sour. Veld is called "sour" wherein there is a bar of clay lying within a foot or two of the surface, composed of materials of so fine a nature as to be impervious to the movement of water through it.

On this bed the water lies like in a vessel, and the finer materials accumulate until the whole soil gets silted up. The movement of water being towards the surface only through evaporation, in the absence of drainage below drawing off surplus water, there gathers an accumulation of salts, which, though not injurious to certain grasses, or it may happen that grasses acquire immunity, yet when grown on such a soil this combination of mechanical and chemical conditions produces grasses that are termed "sour" and differing in character from that grown on open soils.

It happens that animals bred on such veld can accommodate themselves to it, but a change from sour veld to sweet, or from sweet veld to sour involves a danger to the health of stock.

Sour veld can be remedied in a large measure by underground drainage or even open drainage, but a sweet veld, though coarse, cannot be made sour so long as there is a free movement of water below.

Of course, soils derived from dolomite rock are most liable to be "sour," because they not only weather very fine but they may also contain an excess of magnesia.

Banded Ironstone has furnished a large breadth of soil formation throughout Rhodesia. There are not only the red soils derived directly from this rock but there are also large areas formed from secondary deposits of the same.

Soils formed from these subsequent deposits often contain large amounts of carbon in a free state, which is derived probably from bands of a graphitic nature interspersed with the ironstone rock.

These red soils have a character which differs so much from all other types of soil that they may be regarded as an order by themselves in so far as the process by which their fertility is derived is concerned.

In this case iron oxides take the place of lime as agents in furnishing the supply of soluble salts required by plants.

It is the case that both lime and iron are absolutely essential for the growth of all plants, but the amount actually used and taken up in the tissue of plants is infinitesimally small.

What lime is mostly required for in a soil is to act as a base in neutralising the acid bodies formed in the ultimate



oxidation of organic matter. To this also may be added its effects in promoting the aggregation of the finer matter in clays.

Now in these red soils iron oxides take the place of lime as the basic matter in the soil. In the lower parts of the soil the iron parts with a portion of its oxygen, and when brought to the surface it again becomes peroxidised; but in this process it acts as a carrier of oxygen with which it freely parts to carbon, which is present in decaying organic matter. Thus carbon di-oxide is presently formed, which is free to act on and combine with bases such as potash, soda rendering these soluble bodies. But the iron in the hydrated state is also a powerful base and neutralises humic acid and other organic acids formed in the soil.

From this it will be seen that these red soils may be highly fertile, even although there is an apparent deficiency in the lime content. Indeed, it would be difficult to fix a standard as a minimum determining what is the amount of lime necessary for fertility in these red soils, particularly if it was all present as a carbonate.

No soil parts with all fertilising matter, but in this country the effects of heat within the body of the soil as promoting chemical action has to be further studied before minimum standards of fertility can be established.

But methods to be pursued in the cultivation of these red soils may not be exactly the same as that pursued in the cultivation of black loam soils. In the case of rich loam soils it is not always judicious to plough too deeply when breaking up new ground, but rather to bring up fresh soil from below as cultivation is continued year by year.

But in these red soils a considerable body is required from the start. As their reaction is generally acid in the raw state a good depth turned up hastens the neutralising process indirectly besides giving free play to the root system in selecting from spare quantities.

Moreover it must be taken into account that although these red soils are composed of finely divided material, and are even clayey in their properties, yet it happens that pure silica is a product liberated through the reactions that take place in the soil when the iron is present as a silicate. Thus, much of this finely divided matter is silica "flour," and possesses less useful properties than silicate of alumina in soil combinations.

The colour of soils is due chiefly to the amount and the particular state of the iron present, which includes all shades of red, yellow and grey.

Where iron is only present in small quantity the colour of the soil is black, and is due to certain amounts of carbon resulting from decaying organic matter.

Large amounts of carbon are generally present in red soils also, but the black colour is masked by the iron oxides.

Soils that absorb and retain moisture well possess properties that contribute to the formation of large quantities of carbon, and it is this decayed and decaying humus material containing carbon that gives the black colour. Where there is a free circulation of air within the soil, that means where there is more sand the soil assumes a lighter colour towards white, grey, bluish white, or bluish grey. Light coloured soils are as a rule more easily affected with drought than soils having a more pronounced colour either red or black.

In cases where a layer of sand or clay overlies a sub-soil largely composed of organic matter such as peat this construction of a soil carries with it not only high fertility but also drought-resisting powers so as to do without much rain.

Some of the vleis soils cultivated in this country partake more or less of this character, and they are valuable for crop-growing purposes.

The nature of the soils found best suited for special crops such as tobacco and lucerne demands the most careful study.

With regard to tobacco soil, there is one governing principle attaches to it, and this is that it must not be acid; the alkaline bases must be present in a condition of activity.

The soils that best fulfil these conditions are those on or near the sandstone formation, together with certain types of clays overlying or mixed with granite sand.

In every case the sub-soil must possess a certain degree of porosity permitting the leaching out salts which are injurious to tobacco, such as excess of chlorides and sulphates. Thus alkaline must be present in the soil in certain abundance in order to form soluble salts of the chlorine and sulphur so that these bodies may be washed out.

The culture of lucerne is only in its initial stages, but deep soils having sufficient lime are most likely to be found suitable. Whether the rich red soils which have only a small lime content will yet grow good lucerne deserves a trial because all the other conditions would be most favourable.

Expression has frequently been given to an opinion that the Southern province Matabeleland is good only for stock, and that Mashonaland is good only for grain growing. Now this division of their respective farming capabilities is too general and too sweeping. Matabeleland is, in fact, good not only for stock, but large areas are also well suited for cultivation; whatever deficiencies the country may possess in respect to crop growing, they are largely overcome by farmers making use of those methods of improvement coming within the scope of farming operations, and towards the exercise of which the carrying of stock lends itself beneficially.

While Mashonaland may naturally possess superior crop-growing powers, it does not necessarily follow that it is unsuited for stock. When any natural deficiencies that the country may possess in that respect are more definitely ascertained it will be seen whether or not practical steps are available with the view of effecting the desired improvements.

With the object of gaining more precise information concerning the nature of Rhodesian soils—the fertility pertaining to the different classes and the purposes to which they are adapted—I have been employed by the Government to carry on this work in the Agricultural Department.

I would therefore invite the co-operation and assistance of every farmer in furnishing me with samples of soil from his farm for the carrying out of this investigation.

Through the examination of a large number of soils from the same and from different localities constants will become manifest whereby standards can be fixed assigning particular courses of husbandry as being the best to pursue in particular soils.

In selecting a sample from a farm for the purposes of analysis the owner should keep in view the kind of farming he is going to pursue—whether general farming, or particular crops such as tobacco, lucerne, fruit-growing, etc.



If for ordinary and general purposes the area wished to be included should be gone over and observed as to colour whether the soil is red or black.

If a farm has one part of the soil red and another black, most likely there will be an area of a grey colour intermediate between both. This part may be let alone unless it comprises a large part of the farm and the samples taken from areas that are more pronounced, one sample taken from the red soil and another from the black.

In all cases the most useful data are to be obtained from spots that are not under cultivation but representing and similar to the adjacent lands that are.

Samples should be taken in the following way:—Dig a few holes three feet deep, say, three or four holes, or more, according to the size of the land, and not too near the bottom nor too near the top if the ground slopes, but at distances apart embracing as large an area as possible.

Care must be taken to avoid tree roots, ant heaps or anything which specially marks a spot, either rank vegetation or the absence of vegetation.

When these holes are dug go over them and examine if they present appearances not differing very widely from each other, and then select the one that has most features in common with the others. Have two light tubes cut, one ten inches long and the other twelve, and both not less than two inches in diameter. On one side of the hole bare away the grass roots and loose matter on the top, and place the end of the ten inch tube over the bared spot; then with a knife cut away the soil round the tube, pressing the tube down all the time until the depth is reached corresponding to the length of the tube, or ten inches. Then cut the soil close by the lower end of the tube, lifting the whole out carefully. Then fill the other tube, the twelve inch one, exactly in the same manner, pressing it down over the spot where the first one was cut off.

Then take a sample of what lies deeper, cutting a small section at or near the bottom of the hole, putting about a pound of it in a tin or bag.

The tubes must be securely covered in at the ends and have a label attached stating the place whence from and the date and tubes and tin packed in a light box or bag for transit.

For tobacco, or any special crops, the samples will be taken in the same way. But in cases where the soil is already under cultivation the upper surface soil should first be taken with the tube from the several holes and the whole thoroughly mixed together, while the tube should be filled from a portion of this mixed soil.

The tube with the sub-soil, together with the bottom soil, will both be taken as before.

In forwarding the parcel of soil as much information as possible concerning the ground should accompany. Whether the situation is near a river, whether sloping ground or a level, the behaviour of the land under much rain or severe drought, whether it yields good crops or poor, and under any particular circumstances. If farmyard manure has been at any time applied, and if ploughed more than once during one year. If outcropping rocks are frequent on the surface, or if come in contact with at the bottom of the furrow, send samples of such rocks along with the soil.

The general idea is to obtain a section of the soil to the depth of three feet representative of a large area, and as near as possible as it exists as part and parcel of the veld.



A portion of the grapes secured from one vine. Grown by W. H. J. Blackie, of Bulawayo.

## South African School of Forestry.

The South African School of Forestry has been established at Tokai by the Government of the Cape of Good Hope. The first session commenced on the 27th February, 1906.

The following Prospectus is issued for the information of persons desirous of admission.

### I. PURPOSE OF THE SCHOOL.

The South African School of Forestry has been established for the purpose of providing instruction in Forestry with special reference to South African conditions. The courses of study are arranged to qualify candidates for the forestry branch of the Civil Service of the several South African Colonies.

The number of appointments offered each year varies according to the requirements of the Forest Service. The exact number offered for each year will be duly advertised prior to the holding of the entrance examination.

### III.—EQUIPMENT.

The long-established Forest Estate at Tokai has been selected as the headquarters of the Forest School. Suitable buildings, which provide accommodation for at least ten resident students, have been erected, together with Reading Room, Forest Library, and Museum.

The extensive forests, containing a great variety of trees in all stages of development, both at Tokai and throughout the Cape Peninsula, offer unique opportunities for instruction.

The laboratories of the South African College have been placed at the disposal of the Forest School for instruction in the various allied subjects; the Government, however, reserve the right to make similar arrangements with any other suitably situated or equipped College.

### IV.—CONDITIONS OF ADMISSION TO THE FOREST SCHOOL.

Applications for admission to the South African School of Forestry must be addressed to the Chairman of the



Board of Management on or before the 15th of January in each year.

Candidates must have fulfilled the following conditions before admission can be granted:—

- (a) They must hold a certificate of having passed the entrance examination; exceptions to this condition are explained in paragraph 6.
- (b) They must submit a medical certificate of health and a certificate of good conduct.
- (c) Candidates judged by the Board to possess these qualifications will be required to pay the fees for the first term before being admitted into residence and in advance for every subsequent term.

#### V.—ENTRANCE EXAMINATION.

The entrance examination will be held in November or December of each year, beginning in 1907. Certain fees are payable, which can be ascertained from the Chairman of the Board of Management.

The subjects of the Entrance Examination are:—

|                   |  |
|-------------------|--|
| Botany.           | } As prescribed for the Intermediate Examination of the University of the Cape of Good Hope. |
| Chemistry.        |  |
| French or German. |  |
| Geology.          |  |
| Physics.          |  |
| Zoology.          |  |
| Trigonometry.     |  |

The trigonometry is that prescribed for the compulsory examination in mathematics.

Until arrangements have been made with the University authorities for conducting this examination, it will be carried on by the Board of Management, at such centres as will best suit the convenience of candidates.

Candidates who wish to prepare for the Entrance Examination may obtain additional information on application to the Chairman of the Board of Management.

#### VI.—EXEMPTION FROM ENTRANCE EXAMINATION.

(a) The Board will exempt from the Entrance Examination any candidate who has passed an examina-

tion which in its opinion is of equivalent value. Candidates will be excused the Entrance Examination if they have passed the Intermediate Examination of the University of the Cape of Good Hope, and have gained not less than 20 per cent. in the marks of any four of the subjects: Botany, Chemistry, Geology, Physics and Zoology.

(b) Nomination for training by the Government of any of the South African Colonies.

7. The course of study occupies a period of two years, being divided into two annual sessions of four terms each. Each annual session begins in February.

The course is so arranged that during the first and second terms of the first year the students will reside at the South African College, where most of their time will be devoted to the allied scientific subjects. The instruction in Forestry will be given at Tokai or other suitable places by one or both of the Forestry Lecturers at least once a week during these two terms.

During the third and fourth terms students will reside at the school at Tokai. On at least two days in the week students must attend lectures at the South African College; the remainder of the time will be devoted to theoretical and practical Forestry.

## SUBJECTS FOR FIRST YEAR'S COURSE.

Mycology.

Plant Physiology.

Forest Botany.

Chemistry of Soils.

South African Geology.

Surveying.

Elementary Climatology and Meteorology.

Foundations of Sylviculture.

Introduction to Forestry.

Forest Law.

During the second year students must reside at the school at Tokai. Students will attend lectures at the South African College either two days a week for two terms or one day a week for four terms as arranged by the Board.

## SUBJECTS FOR SECOND YEAR'S COURSE.

Practice of Sylviculture.

Forest Management.

„ Protection.

„ Utilisation.

„ Administration.

„ Accounts.

„ Engineering.

„ Botany.

„ Entomology.

„ Meteorology.

A tour extending over three or four weeks, during one of the vacations (probably in the winter) will be made in the indigenous forests either of Knysna or the Eastern Province.

## 8. DIPLOMA EXAMINATION.

There will be two Diploma Examinations, one at the end of the first year, the other at the end of the second year.

## II. TERMS AND FEES.

The fees for tuition are £8 10s. per term. In the case of students who reside at College House, fees for board, lodging, etc., are £12 10s. per term, payable in advance. There is an entrance fee of £2 for students who have not previously been in residence at College House.

The fees for residence during the holidays is £1 10s. per week.

In the case of students who reside at Tokai the fees for board, lodging, etc., are £13 10s. per term, payable in advance.

17. Appointments for students entering the South African School of Forestry in 1908.

The Government of Cape Colony offer not later than the 1st of January, 1910, two appointments as Assistant District Forest Officers to students to be selected by the Chief Conservator of Forests from among those who enter the school at the opening of the first term in 1908, and are found to be duly qualified at the end of their course.



18. Students who fail to obtain Government Service.

The Board of Management is prepared to do what it can to help students who have obtained Diplomas, but have not been selected for the Government Service, to find employment elsewhere.

19. Every student is required to conform to the School Regulations, which will be supplied on application.

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## **The Need for Farm Statistics in Estimating the Cost of Production.**

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A very instructive bulletin on the compilation of farm statistics has recently been issued by the University of Minnesota, from which the following article has been compiled, making it as much as possible applicable to the conditions ruling in this country.

Cost of production and market conditions are the basis from which all study of methods should be made in agriculture as well as in other industries. Knowing these facts, the adaptability of various crops to economic production on various soils and in various climates may be ascertained. The difference between the cost of producing a crop and the value of the gross product indicates to the practical farmer the correctness or incorrectness of his methods as well as the adaptability of the crop to his soil and to his needs. The same method of analysis holds good in the production of beef, pork, and milk. The exact cost of producing farm products, the capital required for various types of agriculture, the cost of man and animal labour on farms, and many other important basic facts are as yet unknown to a majority of farmers.

Cost per acre should be made the basis for studying cost of producing field crops rather than cost per bushel or cost per ton. Cost per bushel or per ton varies so greatly with yield that such figures mean little except as long-time averages of yield are obtained.

Unless accurate statistics can be arrived at with regard to the cost of production of all crops and live stock on the farm, it is impossible for the farmer to tell whether he is raising his produce at a profit or loss, and without them he is unable to determine which branch of his business is

bringing in the largest profit. These statistics will enable him to conduct his farm on the strict business lines which are necessary for success. System and efficient management are undoubtedly greater factors in success than natural advantages; waste from idle labour and capital is guarded against, the by-products are completely utilised, and the product created by each machine and each labourer is kept at a high standard by frequent tests.

The fact that many farmers have made money without the aid of systematic plans for field management and farm accounts does not signify that they could not have made more money had their business been more systematically conducted with the aid of well-kept accounts, and the failures of farmers to make financial success of agriculture are due in many instances to the lack of system and intimate knowledge of the business, which can be acquired only by means of systematic farm plans and profit and loss figures. Mistakes once made in conducting an enterprise, and which are clearly outlined and recorded in the books of the business, may be rectified in succeeding years, whereas poor methods may remain in vogue for a long period if no means are at hand for knowing the exact status of the enterprise.

The successful farmer of the future must know not only something of the science of farming but also something concerning the business side of farming, and business knowledge of farming can best be developed by studying the markets for agricultural products on the one hand and cost of production and the internal management of the farm on the other.

The following data are necessary in arriving at the Cost of Production of Crops and Live Stock:—

The exact acreage under cultivation to each crop.

The cash value of "man" labour per hour.

The cash value of "animal" labour per hour.

The number of hours spent in "man" labour on each crop.

The number of hours spent in "animal" labour on each crop.

The cash value of machinery per hour.

The number of hours machinery used on each crop.

Rental value of land.

## THE EXACT ACREAGE UNDER CULTIVATION TO EACH CROP.

The first matter to attend to in obtaining these statistics is to find out the exact acreage under cultivation to each crop. To easily arrive at this data it is advisable to divide up all the arable land on the farm into relatively equal proportions. Say, for example, four different crops are to be grown, then mark off the land into four equal divisions; any of these divisions can again be sub-divided should it be found advisable to grow only a small quantity of one particular crop and more of another, and still the acreage under each individual crop can easily be ascertained by a glance at the map of the farm, provided it is kept up to date. This method will also be found useful in working out a system of crop rotation, and will simplify the general management of the farm.

## THE CASH VALUE OF "MAN" LABOUR PER HOUR.

Before arriving at this data it is first necessary to classify the labour employed. The most useful classification for this country will probably be as follows:—

White labour.

Skilled coloured labour (Cape boys, drivers, etc.).

Ordinary coloured labour.

The labour of the proprietor should be calculated at the same rate as is, or would be, paid for hired labour. The manual labour performed by a proprietor usually is of no more value than that of hired labour, and the reward of his managing ability will be recovered in the net profits of his business.

The hourly rate of wages of white labour is determined by adding the year's wages of a hired man to the cost of his board, and dividing this sum by the number of hours worked during the year.

This rate could be worked out on a monthly instead of a yearly basis, except for the difficulty in determining the cost of board per month, owing to provisions, etc., being bought in bulk, and hence a large sum paid out for them one month and practically nothing for the next.

For skilled coloured labour the method employed is the same, and on a monthly basis, as it is comparatively easy to find out the cost of keep per month of this class of labour.



For ordinary coloured labour the most exact method is to select four to six regular boys on the farm, and keep a record of the number of hours they work per month. Their wages and cost of keep are also recorded for this period. Then if the cost of wages and keep is divided by the number of hours worked, a fair average is obtained of the cost of their labour per hour.

The following Table will give an idea of how this rate is obtained:—

TABLE I. MONTH OF FEBRUARY.

| Name of Boy. | Hours worked. | Wages. | Cost of Keep. | Total Cost. | Rate per Hour. |
|--------------|---------------|--------|---------------|-------------|----------------|
| Jim ...      | 216           | 10 -   | 6 10          | 16 10       |                |
| Jack ...     | 216           | 12 6   | 6 10          | 19 4        |                |
| Joe... ..    | 200           | 12 6   | 6 10          | 19 4        |                |
| Sixpence.    | 212           | 10 -   | 6 10          | 16 10       |                |
| Shilling...  | 220           | 15 -   | 6 10          | 21 10       |                |
|              | 1,064         | 60 -   | 34 2          | 94 2        | 1·06d.         |

The rate of wages varies from month to month according to the number of days per month, and the number of working hours per day; a record should therefore be kept for a year, and the data obtained for one year can be used for obtaining the cost of production for the following year, provided conditions are practically alike.

### CASH VALUE OF "ANIMAL" LABOUR PER HOUR.

The method employed in determining the cost of animal labour per hour is the same as for ordinary coloured labour only on a yearly basis. It is necessary to calculate the rate per hour from an average of twelve months, because the same number of oxen and mules are maintained on the farm for the entire year in order to keep "motive power" ready and available at all times. Rates for animal labour should cover the cost to the

farmer of keeping his oxen and mules through the whole year. The following table will give an idea of how this rate is obtained:—

TABLE II.

| Month.      | No. of Working Oxen. | Value. | Interest on Investment. | Depreciation. | Gear Depreciation. | Cost of Herd. | Labour Cost in Herding Oxen, etc. | Miscellaneous Expenses. | Total.         |                            | Rate per hour. |
|-------------|----------------------|--------|-------------------------|---------------|--------------------|---------------|-----------------------------------|-------------------------|----------------|----------------------------|----------------|
|             |                      |        |                         |               |                    |               |                                   |                         | Hours of Work. | Cost of Keep.              |                |
| Jan. ...    | 16                   | £128   | ...                     | ...           | ...                | ...           | 8/-                               | ...                     | 130            |                            |                |
| Feb. ...    | 16                   | ...    | ...                     | ...           | ...                | ...           | 10/-                              | 21/-                    | 105            |                            |                |
| March. ...  | 16                   | ...    | ...                     | ...           | ...                | ...           | 15/-                              | ...                     | 96             |                            |                |
| April ...   | 12                   | £96    | ...                     | ...           | ...                | ...           | 15/-                              | ...                     | 90             |                            |                |
| May ...     | 12                   | ...    | ...                     | ...           | ...                | ...           | 16/-                              | 5/-                     | 75             |                            |                |
| June ...    | 12                   | ...    | ...                     | ...           | ...                | ...           | 16/-                              | 7/6                     | 50             |                            |                |
| July ...    | 12                   | ...    | ...                     | ...           | ...                | ...           | 16/-                              | ...                     | 50             |                            |                |
| August. ... | 12                   | ...    | ...                     | ...           | ...                | ...           | 16/-                              | 2/6                     | 57             |                            |                |
| Sept. ...   | 12                   | ...    | ...                     | ...           | ...                | ...           | 14/-                              | ...                     | 62             |                            |                |
| Oct. ...    | 16                   | £128   | ...                     | ...           | ...                | ...           | 12/-                              | 15/-                    | 75             |                            |                |
| Nov. ...    | 16                   | ...    | ...                     | ...           | ...                | ...           | 8/-                               | ...                     | 182            |                            |                |
| Dec. ...    | 16                   | ...    | ...                     | ...           | ...                | ...           | 8/-                               | ...                     | 180            |                            |                |
| Year ...    | ...                  | ...    | @ 5%<br>£5 12/-         | ...           | £1 16/-            | ...           | £7 14/-                           | £2 11/-                 | 1,152          | £17 13/- 3 <sup>6</sup> d. |                |

These figures are entirely imaginary, no data being available for calculating even the approximate rate per hour, the table is merely filled in to serve as an example.

A similar table can be made out for mules, which will average higher than oxen owing to the bigger item of cost of keep. Interest on investment, depreciation, and gear depreciation, can be entered up at so much per year; the other items should be entered up each month.

### THE NUMBER OF HOURS SPENT IN "MAN" AND "ANIMAL" LABOUR PER MONTH.

In placing a cash value upon farm labour in the production of crops and various other farm enterprises, the following method should be used. The number of man and animal hours utilised in performing any operation, such as ploughing, on a given acreage, are compiled and then entered under the different classes of labour. The hours of white labour are converted into terms of cash by multiplying the number of hours into the rate per

hour, previously determined, and the other labour employed. The sum of these products represents the cash cost of ploughing under actual farm conditions. The following table gives a good system of recording and classifying labour.

TABLE III.

| Labour.                     | No. of Men | No. of Oxen. | No. of Mules. | Hours.        |                          |                  |            |              |
|-----------------------------|------------|--------------|---------------|---------------|--------------------------|------------------|------------|--------------|
|                             |            |              |               | White Labour. | Skilled Coloured Labour. | Coloured Labour. | Ox Labour. | Mule Labour. |
| Feb. 1st.                   |            |              |               |               |                          |                  |            |              |
| Cultivating Mealies Field A | 4          | ...          | 2             | ...           | 9                        | 27               | ...        | 18           |
| Ploughing Field B           | 4          | 12           | ...           | 4             | 9                        | 18               | 108        | ...          |
| Feb. 2nd.                   |            |              |               |               |                          |                  |            |              |
| Hoeing Mealies Field A      | 10         | ...          | ...           | 1             | ...                      | 81               | ...        | ...          |

This table represents the labour report during two days in February. It is, of course, by no means complete, but is only given as an example. All the hours of man and animal labour are recorded in terms of one man and one animal, and for this example it is reckoned that work is carried on for nine hours each day, except in the case of white labour. At the end of the month the several classes of labour can be totalled up and converted into terms of cash. A further table is then necessary whereby the totals of each class of labour may be allocated to the separate enterprises carried on on the farm.

This table is made up with a separate column for each enterprise carried on; a column for each definite action carried on in connection with the raising of the mealie crop, for instance, should be provided; it can then be ascertained which operation is most costly, and the ingenuity of the farmer can be employed in endeavouring to reduce the expenses on this particular item.



## CASH VALUE OF MACHINERY PER HOUR.

The value of farm machinery consumed yearly on the various field crops is a most difficult factor to determine. In ordinary farm book-keeping the depreciation and repair of machinery should be considered as a general expense of the farm business, but in determining the cost of producing crops it is necessary to distribute the cost to the various crops. The value of farm machinery consumed yearly must include not only depreciation but cash and labour repairs. The problem is still further complicated by the fact that many farm machines are not special machines but are used on all farm crops. For the purpose of distributing machinery charges to the various field crops farm machinery must be separated into several classes, such as, for instance, mealie machinery, hay machinery, all crop machinery, and miscellaneous machinery and tools.

As machines are available for use when once purchased for a considerable number of years, it is necessary to find out the average investment per year, so as to divide it equally over this number of years. This average is obtained as follows:—Take, for example, a machine costing £50, which depreciates £5 every year for ten years. The first year the investment is £50, the second year £45, the third year £40, and so on. Adding the investment for ten years thus obtained gives a sum of £275, and dividing this sum by the number of years in the period (ten) the average investment per year is found to be £27 10s. Now interest on average investment, plus depreciation, plus repairs, etc., gives cash value of machine per year. This sum divided by the number of hours during which the machine is used per year gives cash value of machine per hour. The yearly values consumed in farm wagons is distributed to the crops and other enterprises of the farm in proportion to the number of hours the wagons are used on each enterprise. The number of hours the wagons are used on each crop is determined from the yearly summaries of labour for any enterprise, by adding together the hours of span labour for those operations in which wagons were employed.

## THE RENTAL VALUE OF LAND.

This item is not ordinarily considered by farmers as an item of expense in the farm business, especially in new

farming regions where prospective rises in land values are included in the expectancy of profits. This item cannot be ignored, however, in determining the cost of production or net profit. A reasonable charge must be made for the productive capacity of capital as well as labour. The two are inseparable in carrying on production, and wages must be paid to labour and interest to capital in order to induce them to enter the industry.

Receipts over and above charges for labour, general expenses, and capital in the form of land and machinery may be considered as net profit. The cost per acre in marketing farm products has not been here included in the statistics of cost of production. The cost per acre varies so greatly with the distance hauled, size of load, conditions of road, and yield per acre, that it is deemed advisable to omit it. It is an expense that must not be ignored, however, and will fall heaviest on those crops which are marketed direct, such as mealies, and least on those crops which are condensed by feeding them to live-stock. By using the rates for man and animal labour given in tables I. and II. the cost of marketing a given unit of product may easily be determined.

The following table gives a list of operations performed in producing a crop of mealies.

TABLE IV.

| Operation.            | Total<br>Acreage. | Total Cost. | Cost<br>per Acre. |
|-----------------------|-------------------|-------------|-------------------|
| Manuring ... ..       |                   |             |                   |
| Seed value ... ..     |                   |             |                   |
| Shelling seed ... ..  |                   |             |                   |
| Ploughing ... ..      |                   |             |                   |
| Harrowing ... ..      |                   |             |                   |
| Planting ... ..       |                   |             |                   |
| Cultivating ... ..    |                   |             |                   |
| Hoeing ... ..         |                   |             |                   |
| Reaping ... ..        |                   |             |                   |
| Machinery cost ... .. |                   |             |                   |
| Land rental ... ..    |                   |             |                   |
| Total ... ..          |                   |             |                   |

An estimate has to be made of the value of the standing stalks for pasture, when estimating the full value of the

crop. Forty per cent. of the cost of manuring should be charged to the mealie crop. It is manifestly unfair to debit the crop of mealies with the entire cost of manuring, when the effect of manuring the land can be traced in at least three or four succeeding crops. When once sufficient data has been obtained for completing a record as shown in Table IV. it is very easy to make comparisons with regard to different methods of growing mealies. For instance, a comparison can be made between the cost of planting with a planter, and marking an acre and planting by hand; or again with mealies planted by hand which can be cultivated both ways, the difference in cost by cultivating thus as compared with cultivating and hoeing the ordinary crop can easily be determined. Several other comparisons could be made, but these two are just mentioned to show what use can be made of the statistics when obtained. For determining the cost of ensilage, a table resembling the following should be filled up:—

TABLE V.

| Operation.                         | Total<br>Acreage. | Total<br>Cost. | Cost<br>per Acre. |
|------------------------------------|-------------------|----------------|-------------------|
| Manuring ... ..                    |                   |                |                   |
| Seed Value ... ..                  |                   |                |                   |
| Ploughing ... ..                   |                   |                |                   |
| Harrowing ... ..                   |                   |                |                   |
| Planting ... ..                    |                   |                |                   |
| Cultivating ... ..                 |                   |                |                   |
| Cutting ... ..                     |                   |                |                   |
| Hauling ... ..                     |                   |                |                   |
| Cutting ensilage ... ..            |                   |                |                   |
| Packing ensilage in Silo ... ..    |                   |                |                   |
| Machinery Cost ... ..              |                   |                |                   |
| Land Rental ... ..                 |                   |                |                   |
| Interest on Silo Investment ... .. |                   |                |                   |
| Silo Depreciation ... ..           |                   |                |                   |
| Total ... ..                       |                   |                |                   |

By this table the entire cost of producing the crop can be reduced to actual farm conditions. Only a percentage of the cost of manuring should be charged to this crop.



COST OF PRODUCING FODDER MEALIES,  
PLANTED THICK FOR FORAGE, SHOCKED  
AND STACKED IN FARMSTEAD.

TABLE VI.

| Operation.           | Total<br>Acreage. | Total<br>Cost. | Cost<br>per Acre. |
|----------------------|-------------------|----------------|-------------------|
| Manuring ... ..      |                   |                |                   |
| Seed Value ... ..    |                   |                |                   |
| Ploughing ... ..     |                   |                |                   |
| Harrowing ... ..     |                   |                |                   |
| Planting ... ..      |                   |                |                   |
| Cultivating ... ..   |                   |                |                   |
| Cutting ... ..       |                   |                |                   |
| Shocking ... ..      |                   |                |                   |
| Hauling ... ..       |                   |                |                   |
| Stacking ... ..      |                   |                |                   |
| Machinery Cost... .. |                   |                |                   |
| Land Rental ... ..   |                   |                |                   |
| Total ... ..         |                   |                |                   |

COST OF PRODUCING HAY MILLET OR  
MANNA.

TABLE VII.

| Operation.           | Total<br>Acreage. | Total<br>Cost. | Cost<br>per Acre. |
|----------------------|-------------------|----------------|-------------------|
| Seed Value ... ..    |                   |                |                   |
| Ploughing ... ..     |                   |                |                   |
| Harrowing ... ..     |                   |                |                   |
| Seeding ... ..       |                   |                |                   |
| Mowing ... ..        |                   |                |                   |
| Raking ... ..        |                   |                |                   |
| Hauling ... ..       |                   |                |                   |
| Stacking ... ..      |                   |                |                   |
| Machinery Cost... .. |                   |                |                   |
| Land Rental ... ..   |                   |                |                   |
| Total ... ..         |                   |                |                   |

## COST OF PRODUCING VELD HAY.

TABLE VIII.

| Operation.           | Total<br>Acreage. | Total<br>Cost. | Cost<br>per Acre. |
|----------------------|-------------------|----------------|-------------------|
| Mowing ... ..        |                   |                |                   |
| Raking ... ..        |                   |                |                   |
| Cocking ... ..       |                   |                |                   |
| Stocking ... ..      |                   |                |                   |
| Machinery Cost... .. |                   |                |                   |
| Land Rental ... ..   |                   |                |                   |
| Total ... ..         |                   |                |                   |

When the farmer has obtained these and other statistics he is in a position to ascertain the most economical winter feed for his dairy cows, and all other operations in connection with his livestock.

A comparison between the value of mealie forage and ensilage should be tabulated as follows:—

## MEALIE FORAGE.—COWS SUPPLIED FOR SIX MONTHS FROM TEN ACRES.

|   | £ | s. | d. | £ | s. | d. |
|---|---|----|----|---|----|----|
| By Cash.—Product of — Cows, 6 months        |   |    |    |   |    |    |
| To interest charges on — Cows @ £—          |   |    |    |   |    |    |
| @ 5 % for 6 months ... ..                   |   |    |    |   |    |    |
| To labour, — Cows for 6 months... ..        |   |    |    |   |    |    |
| To grain ration, — Cows for 6 months ... .. |   |    |    |   |    |    |
| To cost of production Mealie Forage ... ..  |   |    |    |   |    |    |
| Net Profit ... ..                           |   |    |    |   |    |    |

## ENSILAGE.—COWS SUPPLIED FOR SIX MONTHS FROM TEN ACRES.

|   | £ | s. | d. | £ | s. | d. |
|---|---|----|----|---|----|----|
| By Cash.—Product of — Cows, 6 months        |   |    |    |   |    |    |
| To interest charges on — Cows @ £—          |   |    |    |   |    |    |
| @ 5 % for 6 months ... ..                   |   |    |    |   |    |    |
| To labour, — Cows for 6 months... ..        |   |    |    |   |    |    |
| To grain ration, — Cows for 6 months ... .. |   |    |    |   |    |    |
| To cost of production Ensilage ... ..       |   |    |    |   |    |    |
| Net Profit ... ..                           |   |    |    |   |    |    |

By this means it can be seen whether the net profit on cows fed on mealie forage exceeds that on those fed on ensilage or *vice versa*.

Similar tests can be made to compare the relative value of veld hay and manna hay, or manna hay and mealie forage; in fact any number of comparisons can be made, provided a daily record is kept of the milk supplied by each individual cow, or by the total number of cows employed in each test.

### SUMMARY OF OBJECTS SOUGHT IN COLLECTING STATISTICS OF THE BUSINESS OF FARMING.

1. To aid in making a study of the business of farming that it may be conducted under the best possible plans.
2. To supply many averages, as cost per acre of various labour operations, and cost of producing field crop products and livestock products.
3. To determine cost per hour of man and animal labour on the farm.
4. To determine the yearly values consumed in farm machinery and the values consumed per acre for various farm crops.
5. To collect data on the feeding of farm animals, and making comparison of methods.
6. To secure practical data concerning the profit from the different farm animals.
7. To keep the performance record of dairy cows, and show reasons for profit or loss on the individual animals.
8. To assist the farmer to so organise his business that such arrangement of crops and livestock may be made as will give the largest net returns.
9. To assist in inaugurating simple systems of accounts for the farm business and the farm household.
10. To secure data concerning the farm home, as the cost of living, the value of foods grown on the farm, and the cost of keeping hired labour.



## Railway Rate Concessions to Settlers.

Information has been received by the Secretary for Agriculture to the effect that the Cape and Rhodesian Railways (Vryburg-Bulawayo Section) have agreed to allow farm settlers in Rhodesia the privilege of importing their goods, etc., at the reduced rates, at any time within six months of their arrival upon production of the necessary Certificate from the British South Africa Company.

The following are the rates to which the above refers :

Summary of the concessionary rates chargeable over the Cape, Rhodesia, and Beira and Mashonaland Railways to settlers provided with the necessary order from the British South Africa Company:—

| Over Cape Government<br>Railways.   |     |                         | Over Rhodesian and Beira and<br>Mashonaland Railways.                    |     |                         |
|---|-----|-------------------------|--|-----|-------------------------|
| Tickets   | ... | ... $\frac{1}{2}$ fare. | Tickets  | ... | ... $\frac{1}{4}$ fare. |
| Luggage.—Double Ordinary Allowance as set forth in Clause 70, Cape Tariff Book, and Clause 25 of Beira and Mashonaland Railway Tariff Book. |     |                         |  |     |                         |
| Extra Luggage   | ... | $\frac{1}{2}$ rate.     | Extra Luggage  | ... | $\frac{1}{4}$ rate.     |
| Furniture, Household Effects and Agricultural Implements, by Goods Train  | ... | $\frac{1}{2}$ rate.     | Furniture, Household Effects and Agricultural Implements, by Goods Train | ... | $\frac{1}{4}$ rate.     |
| Livestock and Vehicles  |     | Ordinary Rate.          | Livestock and Vehicles   |     | $\frac{1}{4}$ rate.     |

Half-fare over Cape Railways for return journey to settlers making a preliminary trip from Cape Town.

Quarter fare over Rhodesian Railways, Vryburg to Bulawayo section, to settlers making preliminary trip from the Cape (full fare must be paid at the commencement of the journey, and a refund of the concession will be made on proof being furnished that the person has actually settled in Rhodesia.)



In the Curing Barn, Pevsner's Farm, Glenville. Some of the stages in the Curing of Turkish Tobacco.



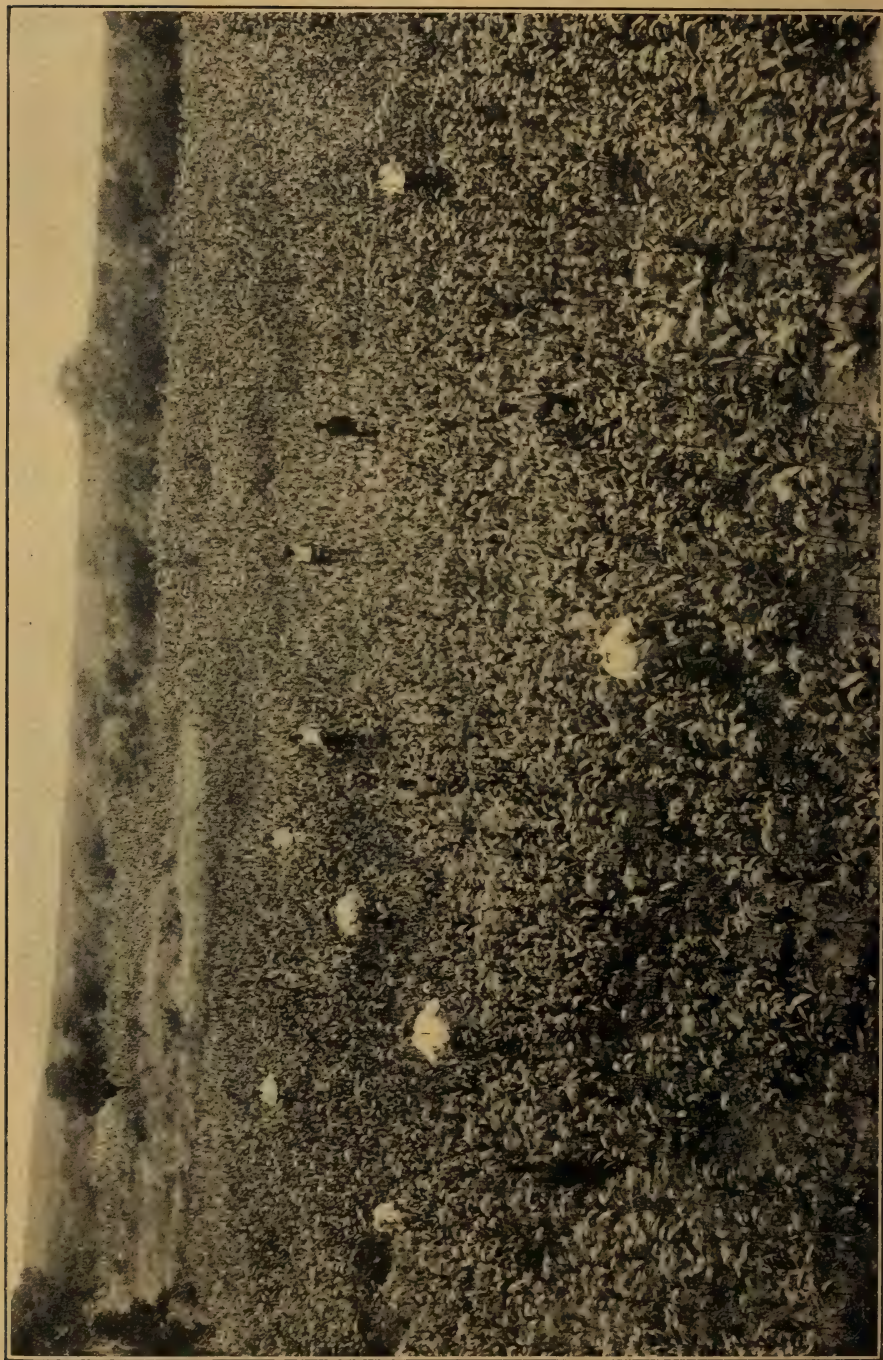
## Tobacco Notes.

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Turkish tobacco culture is one of the established industries of the Bulawayo District, and the names of some of the growers there are well known throughout the country. Some of the more recent beginners are making rapid progress, and the fifteen acre field of Mr. Bains is a sight worth seeing. Mr. Pevsner, of Glenville Farm, has a nine acre field of almost perfect growth, and is rapidly clearing land for his next season's crop. Mr. Leary, of Lochard, has fourteen acres of American, and three of Turkish tobacco, and with the aid of his new flue-curing barn, should make an excellent showing, both on the market and at the Agricultural Shows. Mr. Rayner, of Plumtree, whose tobacco secured for him so fancy a price last season, is this year devoting the same painstaking care to his crop, and Messrs. Barker Bros. have a much larger crop than ever before. The extensive experiments being conducted by the Mashonaland Agency, at Lochard, the Rhodesia Consolidated at Hyde Park, the Bulawayo Syndicate at Umguzan, the Charterland Goldfields at Helenvale, and many farmers throughout the district, are all of interest, and point to a rapid extension of the industry as soon as the experimental period is followed by that of commercial expansion.

Tobacco growers no longer dispute the feasibility of covering plant beds, for some protection has been proved to be essential to the certain growth of insect-free plants. The unsatisfactory growth complained of by some has been the result of too heavy a covering. Heavy calico does not admit sufficient air, and the plants are consequently tender and not easily transplanted. The cloth used as covering in other countries has a wide mesh, and while it keeps out insects and affords some protection from extremes of temperature, the plants are much hardier than those grown under heavier calico. Forty thousand yards of this cloth have been ordered for Rhodesian tobacco growers, and it is thought that the landed cost will be about 2d. a yard. Planters should estimate their requirements as soon as possible, and any order sent to this office will be transmitted to the proper source. It will no doubt be difficult to supply those ordering late in the season.





A Field of Turkish Tobacco on Glenville Farm, Bulawayo.

The close planting so necessary for Turkish tobacco does not permit of horse-hoeing, but there are several types of hand cultivators that are useful for this work. These cultivators, with the plough attachment, may be used for opening of planting furrows, and will be found to greatly accelerate that operation. Turkish tobacco growers should instruct some merchant to order these implements before the commencement of the next planting season. See illustrations.

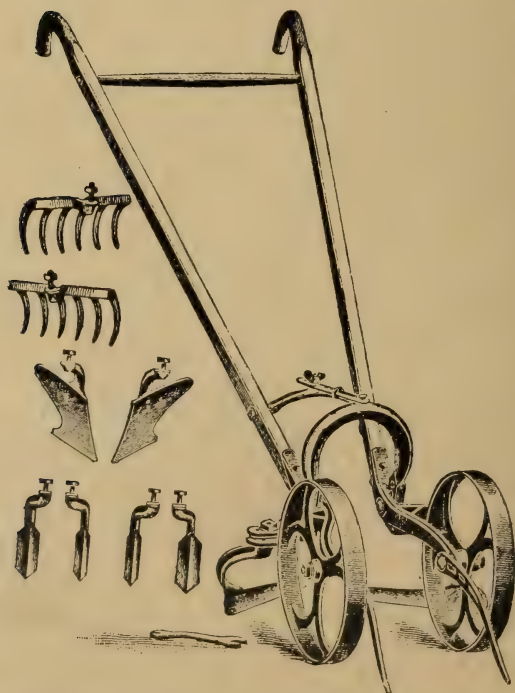


No. 16 Planet Jr. Single Wheel Hoe, Cultivator, Rake and Plough.

Many lands that will grow tobacco of the best quality are not sufficiently fertile to produce a profitable crop, and manuring becomes a necessity. One of the best ways of preparing tobacco land is to plough under a crop of Kafir beans the previous season. A top dressing of wood ash may be added to this at planting time. If cattle manure is to be used it should be applied the previous season on the maize crop.

We have been experimenting with special tobacco manures, and while it is too early to give results from the financial standpoint, we feel satisfied that it will pay every grower of bright or Turkish tobacco to use it on their crop. This manure can be landed at Salisbury for about £22 a ton, but inasmuch as it has twice the manurial value of ordinary fertilisers, and is free from elements





Useful Implements for the Planting and Cultivation of Turkish Tobacco.



injurious to tobacco, it is cheaper than a manure selling for a less price. This price brings the cost of manuring tobacco to from £3 to £5 an acre, depending on the amount used, which is less than the value of a hundred pounds of good tobacco. In connection with green manuring and the use of wood ash, much less of this manure may be used. When the tobacco now being grown with the aid of artificial manure has been cured and sold to manufacturers, a detailed statement of its advantages will be submitted, but we mention the matter now because the next season will be far advanced before the experiment is complete, and orders have to be sent for manure at an early date.

The effect of this manure on the seed beds would, if described, read like a patent medicine advertisement. It grows the plant in half the time required in the ordinary beds, and the plants, unlike those grown with nitrate of soda, are strong and sturdy, with considerable root development.

Our chief idea in testing the manure is to endeavour to improve the quality of the leaf, which we think that it will do, but if it does not, the increase in quantity alone is sufficient to justify its use. The manure being tested by us is mentioned in our advertising columns, but there are other tobacco manures of similar character which would probably be as effective.

Now is the time to plan the work for next year. Tobacco will grow on raw new land, but it does not give a satisfactory return from standpoint of yield or quality; therefore if your land is still raw veld, break it up at once and give it an opportunity to aerate. If you require buildings, erect them during the winter months when you have time, and cheap labour is available. Order your seed, plant bed coverings, fertilisers, and baling presses, at an early date and before you are in the midst of the next busy season, secure your twine, needles, curing sticks, and harvesting baskets. Procrastination is one of the strong points of Rhodesian tobacco growers.

The beginner usually makes the mistake of attempting too much. A year or two is required before sufficient experience is acquired to justify the planting of large fields.

The cost of flue-curing barns need not be excessive if the farmer or his assistant does the work, but a builder

or contractor expects to make a good profit, and the tenders are often enough to frighten a man out of the tobacco business. It may interest growers to know that the sixteen foot flue-curing barn erected by Rev. Leary, of Lochard, cost but £40. In this case the white man's time (he was also engaged in the regular farm work) was not charged, but all of the iron, timber, racks, flues, and labour of natives is provided for at cost price.

The plan shown in this Journal of flue-curing barns and packing house is for the very best type of building, and the material is of the best throughout. This building will last a lifetime, but many growers will prefer a less durable and cheaper building, and can modify the plans accordingly.

The following schedule of work has been prepared by the Public Works Department.

## FLUE-CURING BARNS AND PACKING HOUSES.

### SCHEDULE OF WORK.

Clear the site of all rubbish and leave level.

Dig the trenches for foundations 3' 6" wide and 2' deep or to such further depth as may be required to obtain a solid and level bottom.

The sides of the trenches should be dug square.

Three to one mortar (cement or lime) is three of sand to one of lime or cement.

Build the foundations with the best stone procurable locally, in hammer dressed rubble set and bedded in 3 to 1 lime mortar, all well-bonded, and having no straight joints; no stones to have round faces, and no small stones to be used except where absolutely necessary for bringing surface up to true level.

Foundations to be 2' wide by depth required by solid bottom, and to finish not less than 3' above ground level. Flush up on completion, and well ram the earth to foundations.

On top of finished foundations lay a damp and ant-proof course of 2 to 1 cement mortar 1" thick, laid truly level, and to be given two coats of Stockholm tar laid on hot.

In every yard of face work there must be at least one through stone and at all corners.

Build the walls with good hard, well-burnt bricks, well-bonded, set and bedded in 2 to 1 lime mortar, all joints truly vertical and horizontal, every course well flushed up, and all bricks well wetted immediately before being put into the work. No half-bricks to be used except where legitimately required for closures, all joints to be struck as the work proceeds. All crevices to be filled in. The bricks for the surface arch, and the door and window arches must be rubbed down, and the latter arches must have a skewback of not less than  $4\frac{1}{2}"$ . All arches exceeding 3' in width to have  $2\frac{1}{2}" \times \frac{1}{2}"$  camber bars. Build in all door, window and ventilating frames, all secured with hoop iron.

Build in hoop iron at all angles and every 6' up in the brickwork to give bond, also for tying down roof timbers.

In a double barn the dividing wall must be carried up in a similar manner to gable ends. Do all beam filling.

Put a 3 to 1 cement mortar weathering to top of foundations.

The floor of packing house is to be formed with good hard bricks set and grouted with fine sand.

Construct the roof with wall plates and principals  $4\frac{1}{2}" \times 1\frac{1}{2}"$ , the latter strongly nailed and clinched; the wall plates tied down and clinched, the wall plates tied down with hoop iron and principals strongly spiked to wall plates. Hoop iron may also tie round the bottom purlin. Purlins to be  $3" \times 2\frac{1}{4}"$ , strongly spiked to principals.

There must be four principals to a single barn.

The lean-to roof to have rafters  $6" \times 1\frac{1}{2}"$  spaced not more than 4' apart, upper ends built into wall. Wall plates  $4\frac{1}{2}" \times 1\frac{1}{2}"$ , purlins  $3" \times 2\frac{1}{4}"$ , all nailed and spiked where required as above specified.

Cover the roof with 24 gauge galvanised corrugated iron, free from corrosion or other defects. Iron to have a vertical lap on one and a half corrugations, and a horizontal lap of not less than 9", to be secured to purlins with g.i. screws and g.i. and lead washers. Iron to fit close at ridge and against wall of lean-to roof. Cover the ridge with 18" g.i. ridging fixed as specified to iron, and beated down into corrugations of iron.

Put  $6" \times \frac{7}{8}"$  fascias fixed to ends of principals and  $6" \times \frac{7}{8}"$  large boards fixed to ends of purlins.



Put to the eaves  $4\frac{1}{2}$ " o.g., g.i. guttering fixed to fascias with proper bolts and tubes well soldered at joints. Put  $3\frac{1}{2}$ " diameter g.i. down spouts where marked R.W.P. on plan supplied with proper bands and shoes. Put 10" flashing (No. 10 sheet zinc) along back of packing house roof, turned in to chase in brickwork and well wedged, flashing to be beaten into corrugations of iron. The frame for gable ventilators to be cut out of  $3$ " x  $2\frac{1}{2}$ ", rebated, with bevelled cill, securely built in. The door of ventilator to be 2' square of flooring well battened, and to be hung at top with two 12" T hinges, supplied with pulley and cord to open outwards.

The floor level ventilators to be of the "Rabbit Hutch" type, 14" square.

The doors to barns to be 7' x 3", made of flooring, battened with flooring battens screwed to doors, doors to be hung in two halves, each half hung with two 18" T hinges, frames  $4\frac{1}{2}$ " x 3" rebated, with bevelled cill.

Doors to packing house to be of similar construction, hung as double doors with two 24" T hinges to each leaf.

Windows to be 12 light 12" x 14" American stock, supplied with furniture, etc., all complete.

All woodwork should be well painted over with carbolineum before being put into the work (this includes to doors and windows).

## QUANTITY OF MATERIALS REQUIRED.

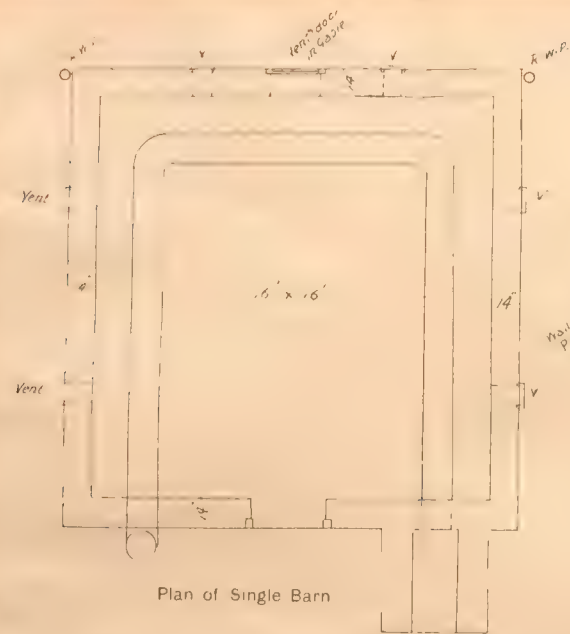
|   |     |     |     |     |        |
|---|-----|-----|-----|-----|--------|
| Bricks for single barn  | ... | ... | ... | ... | 25,000 |
| „ double barn   | ... | ... | ... | ... | 42,000 |
| „ packing house   | ... | ... | ... | ... | 8,500  |
| Iron for single barn, 20 sheets of 11' and screws and washers |     |     |     |     |        |
| „ double barn, 40   | „   | 11' | „   | „   |        |
| „ packing house, 10   | „   | 10' | }   |     |        |
| 10  | „   | 11' |     | „   |        |

### Timber, single barn.

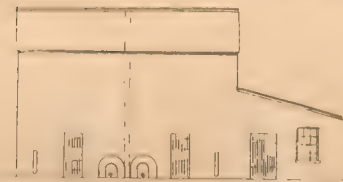
|                           |     |     |                             |   |                                     |
|---------------------------|-----|-----|-----------------------------|---|-------------------------------------|
| Wall plates               | ... | ... | 2 of 18' 6"                 | } | $4\frac{1}{2}$ " x $1\frac{1}{2}$ " |
| Principals                | ... | ... | 4 „ 57' 0"                  |   |                                     |
| Purlins                   | ... | ... | 6 „ 18' 6"                  | } | $3$ " x $2\frac{1}{4}$ "            |
| Fascias                   | ... | ... | 2 „ 18' 6"                  |   |                                     |
| Barge boards              | ... | ... | 4 „ 11' 0"                  | } | $6$ " x $\frac{7}{8}$ "             |
| Door                      | ... | ... | 54' „ 6"                    |   |                                     |
| Door frame                | ... | ... | 18' „ $4\frac{1}{2}$ " x 3" |   |                                     |
| Vent, door frame (1 only) | ... | 10' | „ 3" x $2\frac{1}{4}$ "     |   |                                     |
| „ „                       | ... | 14' | „ 6" x $\frac{1}{2}$ "      |   | ceiling                             |



TOBACCO FLUE CURING BARNS and PACKING HOUSE.

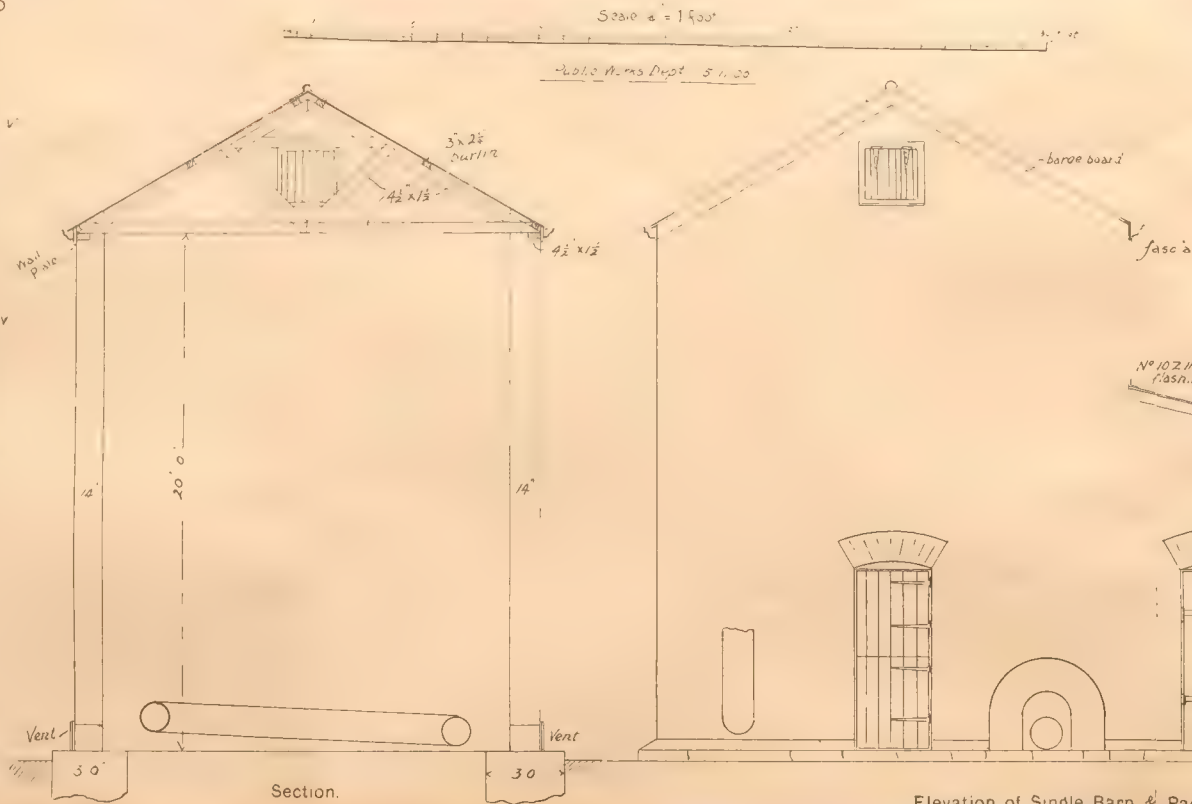


### Plan of Single Barn



Elevation of Double Barn and  
Packing House,

2. 10



Section.



### Plan of Packing House



Elevation of Single Barn & Packing House.

SUPPLEMENT TO  
RHODESIAN AGRICULTURAL  
JOURNAL  
APRIL, 1907

weather say



*Timber, double barn.*

Wall plates, double single barn.

Principals, " "

Purlins, " "

Fascias, " "

Barge boards, same as single barn.

Door, double single barn.

Door frame, double single barn.

Vent, door frame, double single barn.

" " " "

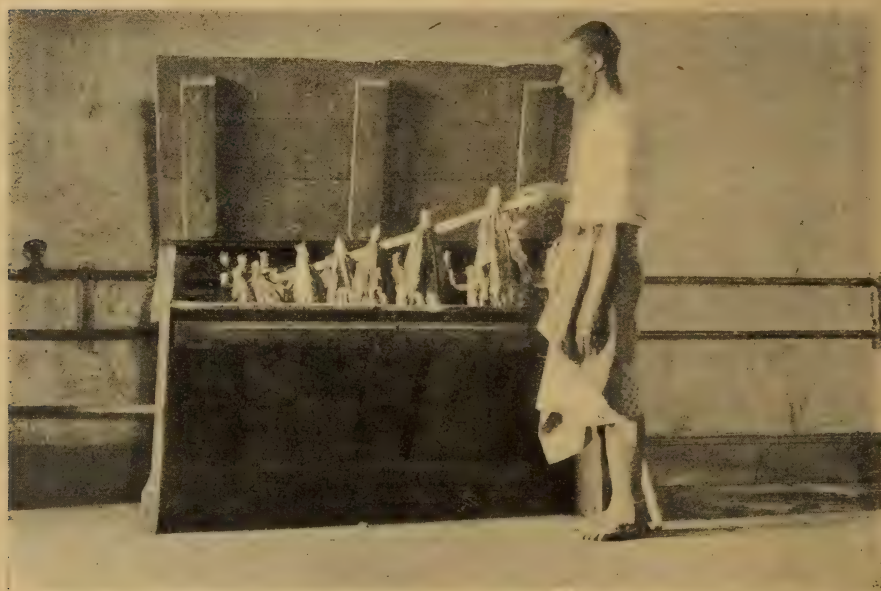
In the case of the double barn, there being but one ventilator in the end of each half, another must be provided in the roof at the inner side of each barn; this may be done by extending a short section of flue pipe through the roof at that point and covering the lower end of it with a light door held in position by a balancing weight and opened by a rope from the floor of the barn.

In a barn sixteen feet square, the flues enter the barn for a distance of sixteen feet, then cross for a distance of nine feet between elbows, then turn and run out, which requires another twelve feet. The flues should be continued up the outside of the barn for a distance of from nine to twelve feet. Flues of from 12 to 15 inches in diameter are the best size, the smaller size being more easily obtained in the country. The first twelve feet of the flue is subjected to high temperatures and should be of 13 to 15 gauge iron; the remainder of the piping may be rolled from 18 gauge black iron. A set of flues of this description were recently made for £7 10s.

## PACKING HOUSES.

Every tobacco grower should, in addition to his barns, have a room for the grading and packing of tobacco. There are three essential features in a good packing house. It should be well lighted; it should be so tight that the moisture conditions can be regulated regardless of weather conditions; and it should be supplied with steam from a near-by boiler. If it is near the curing barns the same boiler that is used for the conditioning of the leaf in the curing barn can be utilised. We have described a local made boiler in an earlier issue; the price of such a boiler is £10.

The conditioning of leaf for packing or grading is done in a small chest. This chest should be 4 feet 9 inches long, and from  $2\frac{1}{2}$  to 3 feet wide at the top. Steam is admitted at the bottom of the chest through a perforated pipe. Just above the pipe there should be a layer of closely-fitting curing sticks sufficient to spread the steam, and at the same time prevent the tobacco leaves from coming in contact with the pipe. Near each end of the chest a cross piece is put in, and the curing sticks with the hands of tobacco are hung on these. The



Home-made Steaming Chest for grading Tobacco.

lid is closed and the steam cock opened for a few seconds. The tobacco is then sufficiently pliable to admit of handling and packing while hot, although it will appear perfectly dry as soon as cool.

### FLUE CURING.

The primary object of flue curing is to produce bright colours in the leaf, but in the dry climate of South Africa it is becoming evident that heat has a value in the curing of dark tobacco, if for no other reason than to remove the greenness so common in much of the air-cured leaf. Turkish tobaccos have been commonly sun cured, but

experiments conducted during the past season indicate that these tobaccos can also be cured in the flue barn. By this method the loss due to unseasonable weather is avoided, the colour is brighter and more even, and as far as can now be judged there is no loss in flavour or aroma.

When harvesting tobacco for flue-curing we prefer to prime the leaves, that is, pick off only those leaves that are fully ripe. The tobacco is then carried in baskets to the barn, where it is tied on sticks. Each stick is  $4\frac{1}{2}$  feet in length, or long enough to extend from one pole to another. A hundred and fifty leaves go to one stick, and two good boys will tie seventy-five to a hundred sticks in a day. The leaves, in bunches of three, are fastened by means of a peculiar hitch, easily made but difficult to explain.

The barn should be filled as rapidly as possible, for if a portion of the leaves become wilted while the remainder are still fresh it is almost impossible to cure a barn of even bright colour. As soon as the barn is full, start a slow fire in the furnace, and slowly bring the barn up to a temperature of 90° F. A hot fire at the start will ruin much of the tobacco in a few minutes. The temperature of 90° should be maintained until the leaf has yellowed. Where the leaf is ripe and sappy and has been grown on a sandy soil this will not be difficult, but where the leaf has made a slow growth and is leathery it often refuses to colour. In the latter case increase the humidity of the room by sprinkling water on the flues until the air feels moist. The yellowing stage will require from twelve to twenty-four hours, depending upon the character of the leaf, and where more than a full day is required it is almost impossible to secure really bright tobacco, and the attempt may be abandoned. If the building is required the obstinate leaf may be shifted into another building and left to air-cure, but if it is left in the flue-barn a slow fire should be kept up for several days, and the temperature of the room maintained at from 80 to 100 degrees. So long as the temperature does not run over a hundred the fire will not require much attention. This, it must be remembered, is for tobacco that will not yellow, and does not apply to bright tobaccos.

The second stage of flue-curing is that of fixing the colour. As soon as the leaf has turned to a greenish yellow colour commence to slowly increase the tempera-



ture. If the leaf is permitted to become a bright yellow before the temperature increases there is danger of it becoming dark and badly sponged before the colour is fixed. As a rule the temperature is increased at the rate of about two degrees an hour, but this is dependent upon the condition of the leaf. The fixing of the colour is the difficult stage in flue curing, for if the temperature be too low and the room humid the leaf will "sponge." By sponging we mean that it develops nasty porous brown patches. Sponging is checked or prevented by slightly increasing the heat and opening the ventilators, but it must be remembered that the heat cannot be rapidly increased, for as the heat increases the tobacco sweats (is covered with beads of moisture), and the result is that the novice again increases the heat in an attempt to carry off this moisture, the tobacco sweats still more, then heat is again increased until a point is reached where the surface of the leaf is cooked and it begins to "blotch." The term blotching is used to describe the smooth, hard reddish brown spots that appear on the leaf as the result of high temperatures. When the leaf blotches, the beginner is frightened, and rapidly reduces his temperature, with the result that the warm leaf still sweats, and sponging becomes general throughout the barn. The correct practice is to keep the leaf sweating, but to so regulate the temperature and ventilation that the moisture is carried off the leaf as rapidly as it appears, and at the same time to limit the ventilation sufficiently to prevent the surface cells of the leaf from being dried out faster than they can draw moisture from the interior of the leaf. If these surface cells become dry at this stage the moisture cannot escape rapidly through them, but remains in the leaf, and at the slightly higher temperatures to follow results in blotching. The leaf must sweat, but cannot do so in a very dry air, but if at the same time the air is over humid, oxidation is rapid, and the leaf sponges. To state in another way, sponging is the result of moisture on the surface of the warm leaf; blotching is caused by the failure of the moisture to escape and the cooking of that portion of the leaf by high temperatures, and is often induced by the drying out of the epidermis of the leaf at any of the previous temperatures. Sponging is prevented by ventilation and by the slow increase of temperatures; blotching is prevented by the same

means, but, in sponging, the greater the ventilation the less the danger; in blotching, the greater the drying due to ventilation the greater the danger. To prevent both it is necessary to strike a happy mean, which is not difficult where all the leaf in the barn is of the same degree of ripeness. Where the leaf in the barn varies regarding the degree of ripeness it will not undergo the same changes at the same time, and it is necessary to regulate the heat and ventilation according to the requirements of what appears to be the most valuable class in the barn.

To go back to the first or yellowing stage. As we have before stated a certain amount of humidity is necessary during the yellowing stage, for if the moisture escapes rapidly from the leaf all action within the cells ceases and the chlorophyl (green colouring matter) of the leaf is not destroyed as it is when the leaf remains alive and slowly starves to death. This destruction of chlorophyl by the dying leaf is noticeable in all leaves, except those that are rapidly killed by excessively high or low temperatures, dry winds, etc. In an ordinary air-curing barn the same yellowing takes place where the weather conditions are favourable, but in a flue barn the change is much more rapid, and under the influence of heat the leaf yellows as much in a day as it would in the air barn in a week. In the air barn, however, if the weather is cold or dry only a portion of the chlorophyl disappears, and the leaf is left with a nasty green tinge. Now it is evident that under ideal conditions any leaf would become as yellow in an air-curing barn as in a flue-curing barn, but those ideal conditions seldom exist, for if the weather is excessively moist each portion of the leaf oxidises as rapidly as the chlorophyl disappears, and we never observe the yellowing stage.

Now in the yellowing stage in the flue-curing barn the novice remembers all that he has heard about excessive moisture in the barn inducing sponging, and in an effort to keep ahead of his tobacco he starts full ventilation too soon, that is, before the leaf has yellowed, and ends up by so drying the leaf that there can be no change, and it therefore remains green. This is the same effect as produced in an air-curing barn or in sun-curing by drying winds.

To return to the fixing of the colour. After the temperature has been slowly increasing for from fifteen to twenty hours, and the leaf has lost the greater portion of its moisture, it will begin to dry at the tips and around the edges. Where this drying is general throughout the barn, the second stage may be regarded as at an end. The temperature at this point should be about  $120^{\circ}$  F.

The third stage simply consists of the rapid drying out of the leaf, and is commonly called "the killing of the leaf." The temperature is increased from  $120^{\circ}$  to  $135^{\circ}$  or  $140^{\circ}$  F, at the rate of four or five degrees an hour, and is held at the higher temperature until the midrib is perfectly dry and brittle. During this stage the ventilators are partially open, but inasmuch as less moisture is escaping than during the sweating stage, and because of the great draught due to the heat, they are not fully open. Wide open ventilators mean a large consumption of fuel.

If the tobacco has not been primed but the whole plant hung, the temperature is then increased to  $160^{\circ}$  or  $175^{\circ}$  and continued until the stalk is dry. No moisture must be left in either the mid-ribs or stalk for this moisture will in time run back into the leaf and result in red streaks.

As soon as the drying is finished the fires are drawn. The leaf may then be rendered pliable by running steam into the room, after which it is taken down and removed to the packing house for re-grading. In the packing house it may be bulked on the curing sticks and handled at a later date. In moistening the hanging leaf only use enough steam to render the body of the leaf pliable, while the mid-rib remains brittle. Excessive moisture will result in mould and in the darkening of the leaf.

When it is desired to pack the leaf stored in the packing house, hang the sticks in a steaming case and moisten with hot steam. The leaf will be pliable while hot, and can be baled, but as soon as cool will be brittle and appear free from moisture. If the leaf is pliable when cold it is evidence of too much moisture, resulting from an over-prolonged steaming in the chest.

During the curing process, large timber will be found to give a more even fire and less changeable temperature than small sticks, and the bulk of the wood should be heavy. Small sticks are needed to put with the large



wood whenever the fire is low. When the fire is to be left for some time, and it is feared that the temperature will vary, it is safer to so arrange it that it will become less instead of greater, for the brick walls of the buildings will give up sufficient heat to compensate for a diminishing fire. A large bed of coals will maintain an even temperature for a couple of hours. Avoid rapid changes in temperature, and even where the temperature is found to have dropped below the desired point, do not attempt to force it up rapidly by means of a large fire, for the result will be excessive temperatures in a few minutes, and the ruination of the tobacco. When it is intended to open the ventilators, slightly increase the fire before doing so, and thus prevent a falling temperature. At sundown additional firing is necessary to maintain the day heat, and at sunrise the fire should be slightly reduced unless an increased temperature is desired.

The first, and perhaps the most essential, point in connection with flue-curing is to have all the tobacco in any one barn uniform in ripeness and in body, and all as ripe as possible.

Turkish tobacco, being light and thin, changes much more rapidly than Virginia leaf, and all the stages are of shorter duration. The same high temperatures are not required, and  $120^{\circ}$  is the highest temperature that we care to use for this type of leaf. The leaf dries rapidly, and the ventilators need never be fully open.

## TOBACCO BREEDING.

No tobacco planter can walk through his fields without observing that it is seldom that any two plants are alike. Every possible variation in the shape and texture, number, and placing of the leaves is apparent, while some plants are destroyed by disease or ruined by insects, although others at the same time and under the same conditions escape. There are few plants in any field that approach the ideal, but if every plant were equal to the few best plants the return from the field would be doubled. Soil and climate largely influence the quality of the tobacco crop, but they cannot be held accountable for the variations within the one field. The variations are due to inherited tendencies. To combine all the desir-



Differences in characters of leaves from plants of the same variety of Tobacco.



Uniformity in Tobacco Plants from Self-fertilized Seed. The two central rows of one strain ; adjoining rows from a different strain of same variety.

able characteristics appearing in the field in one plant, and then have every plant in the field alike, has always been the aim of the best tobacco growers, and while great improvement has been effected in the tobacco plants, growers have failed to secure their ideal strain, the reason for the failure being largely due to the fact that the seed plants have not all been of the same type, and that these seed plants have often been cross pollinated by insects, resulting in endless variations and reversions. It has only been during the past few years that there has been any truly scientific breeding of the tobacco plant, and the results already secured certainly indicate that there is no plant so susceptible to improvement as tobacco.

Many species of plants require cross pollination (pollination from other plants within the species) before they will produce fruit at all; although a greater number are more vigorous as the result of cross pollination, there are a number of species that appear to be more vigorous when self-fertilised, and tobacco is one of these. Cross pollination produces endless variations, and thus permits of the selection of better types, but, at the same time, where cross fertilisation is necessary it is often difficult to fix the type, because of those variations. Self-fertilisation (which is practically the same as in-breeding in the animal kingdom) renders it more easy to fix a type, although, as before stated, it often results in a loss of vigour. The fact that tobacco retains its vigour or even becomes more vigorous when "in-bred" renders the task of fixing desirable types much more easy. The tobacco plant is at the same time wonderfully prepotent (prepotency has been defined as the quality of transmitting characteristics to progeny), and a self-fertilised parent plant will very largely transmit all of its good and bad points to the next generation of plants. Thus if we select a parent plant because of the fineness of its leaf, or its disease-resistant powers, we may expect to find those qualities in its progeny. It is then a comparatively simple matter for a tobacco grower to secure a strain in which the plants are very uniform, although the value of that strain will depend on the correctness of the breeder's ideal, and the judgment used in the selection of plants to conform to that ideal.



The method used in the selection of the parent plants is as follows:—At any time that the grower observes a plant in the field that in any way approaches his ideal, it is marked. At topping, the blossom of this plant is not removed but is covered with a stout oiled or Manila paper bag. Any flowers that are already open at covering time are removed, and the large seed branches are broken off, leaving but the central cluster. The upper leaves on these plants are removed down to the point where the plant would have otherwise been topped. These covered plants are observed as often as possible, and from time to time those that show inferior qualities or vary greatly from the ideal are discarded. When the seed is ripe, the head, still in the bag, is cut off and hung up in a dry room. Throughout the season each plant has been numbered, and notes have been made regarding it. The few plants that have approached nearest to the ideal are in the end saved for next year's seed crop. The following season the seed of each parent plant is sown in a separate bed, and when the plants are set, the progeny of each parent are kept by themselves in the field. The second year the selection is made from the plants in the plot that is the most uniformly good. This process is carried on year after year, and if good judgment has been exercised there should be a steady improvement.

Where the grower can devote slightly more time to the work a more thorough method of selection is adopted, and the leaves of each seed plant are so marked in the curing barn that they can be identified with their seed head at any time. These leaves are tested after being cured, and the final selection is made on the basis of the quality shown, and the corresponding seed heads saved for the growth of the following crop.

The cross fertilisation of plants of desirable types with its resulting variations, and a new series of selections from the self-fertilised progeny of the cross, is the next stage for the systematic plant breeder, although somewhat beyond the scope of the average commercial tobacco grower.

The tobacco grower who has but a little time to devote to this work may effect a wonderful improvement, even if he limits his selection to the growth of the plants in the field without carrying the test through the curing barns.



Flower Head protected from foreign pollen ("cross-fertilization"), by a manila bag.



## WHY WE HAVE IMPORTED SEED.

Three years ago we were not certain that we could grow tobacco of any great value, and in the event of the tobacco growing being of value, we did not know what types would result, or what the merits or demerits of any type would be, therefore it was necessary to carry on widespread experiments with imported seed. Out of some thirty varieties imported we have discarded all but a bare half-dozen, but the few varieties retained are producing us valuable types of tobacco in several districts. Seed selection in the past, particularly by men not yet fully familiar with the details of tobacco culture would have resulted in a mixing of types and the establishment



Resistant and semi-resistant Plants growing on infected soil.

of undesirable strains. With the best of intentions on the part of the grower, the selection of seed by him, might result in a slight falling off in the quality of his tobacco until the product would in a short time discredit the industry.

Imported seed is, however, by no means fully satisfactory, for not alone is there some uncertainty regarding its age and quality, but there are amongst the plants grown from all imported seed, regardless of the country of its



origin, a large number of wildings. Wildings are plants with coarse leaves and branches, resembling the original wild type, and the quality of this tobacco being decidedly inferior, their presence in the field materially reduces the value of the crop. But further than this, imported seed, being from countries where our "white blight" is not a tobacco disease, has not acquired, as far as varieties are concerned, any resistance to it although individual plants often show a partial or complete natural resistance.

It is practically certain that we can by selection develop strains free from wildings and deformed plants, and resistant to disease, and it is also certain that we can develop uniform strains with better shaped and better placed leaves, but at the same time we do not know whether the quality of the tobacco from the standpoint of brightness, of leaf, flavour, and aroma will tend to become better or worse. There is a possibility that our cigarette types might in time acquire the flavour of Boer tobacco (which, while well enough in some types of pipe-smoking tobaccos, must be avoided in the substitutes for imported leaf that we are now growing).

We are inclined to think, however, that a rigid selection of parent plants, with this possibility before us, will result in a retention or even an improvement of these desirable qualities. At the present time it is worth while to breed for those qualities such as disease resistance, which we know we can secure, and if experience demonstrates that there is a loss in aroma or colour we can then change our methods.

The Agricultural Department is now conducting some tobacco breeding experiments, but with a limited staff, it is impossible to do this work in more than one or two districts at the present time, so rapid advance is dependent upon the efforts of the men who are every day in their tobacco fields, and who will be the first to profit by the results.

For much of the work done in tobacco breeding we are indebted to the work of Mr. A. D. Shamel, of the U.S. Department of Agriculture, and his report on the subject, issued as Bulletin 150 of the Connecticut Experiment Station, should be secured by those interested in the work.

## Poultry Notes.

Enquiries have recently been received as to what most nearly approximates to the ideal poultry feed, from the point of chemical constituents, using the ordinary poultry grains available in this country.

For determining this point it is best first to consider the constituents of an egg, and then see what ration can be fed which most nearly corresponds to it.

|               | Water % | Ash. | Protein % | Fibre % | Carbo Hy-<br>drates % | Fat Ether<br>Extract % |
|---------------|---------|------|-----------|---------|-----------------------|------------------------|
| Hens' Eggs... | 73.7    | 0.8  | 15.0      | ...     | ...                   | 10.5                   |

It will be seen from this that an egg contains a very large percentage of Protein. The following table showing the Composition of Feeding Stuffs will enable us to compare them with the composition of an egg.

### COMPOSITION OF FEEDING STUFFS.

|                 | Water % | Ash % | Protein % | Fibre % | Carbo Hy-<br>drates % | Fat Ether<br>Extract % |
|-----------------|---------|-------|-----------|---------|-----------------------|------------------------|
| Maize ...       | 10.6    | 1.5   | 10.3      | 2.2     | 70.4                  | 5.0                    |
| Maize Meal ...  | 15.0    | 1.4   | 9.2       | 1.9     | 68.7                  | 3.8                    |
| Wheat ...       | 10.5    | 1.8   | 11.9      | 1.8     | 71.9                  | 2.1                    |
| Oats ...        | 11.0    | 3.0   | 11.8      | 9.5     | 59.7                  | 5.0                    |
| Buckwheat ...   | 12.6    | 2.0   | 10.0      | 8.7     | 64.5                  | 2.2                    |
| Millet Seed ... | 14.0    | 3.3   | 11.8      | 9.5     | 57.4                  | 4.0                    |
| Kafir Corn ...  | 9.3     | 1.5   | 9.9       | 1.4     | 74.9                  | 3.0                    |
| Meat Scraps ... | 5.4     | 2.4   | 58.4      | ...     | ...                   | 33.8                   |
| Cut Green Bone  | 29.7    | 24.0  | 20.2      | ...     | ...                   | 26.1                   |
| Skim Milk ...   | 90.4    | 0.7   | 3.3       | ...     | 4.7                   | 0.9                    |
| Potatoes ...    | 78.9    | 1.0   | 2.1       | 0.6     | 17.3                  | 0.1                    |
| Lucerne ...     | 8.4     | 7.4   | 14.3      | 25.0    | 42.7                  | 2.2                    |
| Rice ...        | 14.0    | 0.5   | 7.7       | 2.2     | 75.2                  | 0.4                    |
| Turnips...      | 92.0    | 0.7   | 1.1       | 0.8     | 5.3                   | 0.1                    |
| Sunflower Seeds | 8.0     | 3.0   | 13.0      | 28.5    | 23.9                  | 23.6                   |
| Butter Milk     | 90.1    | 0.5   | 3.0       | ...     | 5.4                   | 1.0                    |
| Beanmeal ...    | 14.5    | 3.1   | 25.5      | 9.4     | 45.9                  | 1.6                    |
| Bran ...        | 13.6    | 5.6   | 13.6      | 8.9     | 54.9                  | 3.4                    |

A certain amount of fat and carbohydrates are necessary to maintain the vital functions of all animals, and numerous experiments have proved that the most economical proportion of food constituents is one part of protein to six parts of fat and carbohydrates.

Given the constituents of a number of foods it is very easy to discover the necessary quantities of any two or more to provide the best balanced ration.

This is done as follows:—

Multiply the percentages of Protein, Carbohydrates, and Fats by the number of pounds of each food used in the ration, and divide them by 100. Multiply the percentage of Fat by 2.29, one per cent of Fat being equal to 2.29 of Carbohydrates. Then add the Fat and Carbohydrates together and divide the total by the protein, the result being the “nutrient ratio” of the combined foods.

|              | lbs. | Protein.             | Fats.                | Carbohydrates.        |
|--------------|------|----------------------|----------------------|-----------------------|
|              |      | %                    | %                    | %                     |
| Maize Meal   | 4    | $9.2 \times 4 = 36$  | $3.8 \times 4 = 15$  | $68.7 \times 4 = 274$ |
| Bean Meal... | 1    | $25.2 \times 1 = 25$ | $1.6 \times 1 = .01$ | $45.9 \times 1 = 45$  |
|              |      | .61                  | .16                  | 3.19                  |
|              |      |                      | 2.29                 |                       |
|              |      |                      | 1374                 |                       |
|              |      |                      | 229                  |                       |
|              |      |                      | .3664                |                       |
|              |      |                      | 3.19                 |                       |
|              |      |                      | .61                  | 3.55/5.8              |
|              |      |                      |                      | 3.05                  |
|              |      |                      |                      | 500                   |
|              |      |                      |                      | 488                   |

Thus we find that a mixture of 4 lbs. of mealie meal and 1 lb. of bean meal has a “nutrient ratio” of 1 : 5.8, which is about the proportion it is desired to arrive at, but on working out the “nutrient ratio” of an egg we find it as narrow as 1 : 1.6; therefore, a laying hen must have some additional food rich in protein. During the summer months, if the fowls have a free range, they



obtain this extra protein to a large extent from the number of insects they catch and eat, but during the winter months a substitute must be provided; this can to a certain extent be done by mixing the mash with skimmed milk, which has a "nutrient ratio" of 1 : 2; milk cannot, however, be used to any extent being a liquid, and perhaps the next best substitute is lucerne hay with a "nutrient ration" of 1 : 3'4, a mixture of 3 lbs. mealie meal, 2 lbs. bean meal, 1 lb. skimmed milk, and 1 lb. lucerne hay will be found to have a "nutrient ratio" of 1 : 4. To supply the laying birds with the extra protein it will be necessary to feed them occasionally with cut green bone. This has a "nutrient ratio" of 1 : 2'9, and corresponds closer than anything else to the composition of an egg. It cannot, however, be fed in large quantities owing to its very stimulating nature, but given to laying hens at the rate of one ounce per bird every other day it is one of the most valuable foods the poultry keeper can use.

Green bone is the uncooked bone after the meat has been removed, the more shreds of lean meat there are left on it the more valuable it is. Cooked bones are also valuable as poultry food, particularly on account of the lime they supply for the egg shell. A simple method of preparing cut bone is given later on in these notes.

It will be seen that no ration consisting only of grain supplies sufficient protein for laying hens; to consume the necessary quantity for the making of an egg, she will be obliged to eat a far larger amount of food than is desirable or good for health, the result being a tendency to put on fat, in which condition she is unfit to lay the maximum number of eggs. For cockerels, or young growing pullets, not yet starting to lay, wheat, buckwheat, and Kafir corn are all excellent. Mealies contain by far too large a percentage of carbohydrates and fats to make a good food. They should only be fed during cold weather, and never given whole. It is difficult to give advice regarding Munga on account of no analysis being available. Rice is useful as a change of food, but has a broad ratio 1 : 9'8, and is also deficient in ash, making it unsuitable for growing birds if fed alone. Lucerne, both green and in the form of hay is a most valuable food. When used as hay it should be chaffed and soaked in boiling water and fed mixed with the mash, the water in which it has been soaked being used to moisten the mash.

Although chemically an ideal ration might be fed with the aid of concentrated foods such as beef scraps and dried blood, yet it would not be advisable to feed it too constantly, a change being sometimes necessary even at the expense of the "nutrient ratio" to keep the birds in health.

A simple method of cutting bone when no bone machine is available:—

Get an old jack-plane, well sharpen the plane iron and re-set it. Place the plane upside down on the table, with the handle end against the stomach; take a large piece of green bone in the hands and pull it towards you over the plane iron. Do this as quickly as you like, and a pound of green bone can be cut in a very short time. This will appeal to anyone who has tried to get green bone with a hatchet.

The Salisbury Market Master states that at no time during the past six months has the supply of eggs been up to one-third of the demand, and that for guaranteed new-laid Colonial eggs the following high prices have been obtained:—

|             |     |     |          |        |            |
|-------------|-----|-----|----------|--------|------------|
| September   | ... | ... | from 3/- | to 3/3 | per dozen. |
| October ... | ... | ... | " 2/9    | " 3/-  | "          |
| November    | ... | ... | " 3/-    | " 3/3  | "          |
| December    | ... | ... | " 3/6    | " 3/9  | "          |
| January ... | ... | ... | " 3/9    | " 4/6  | "          |
| February... | ... | ... | " 5/-    | " 6/6  | "          |

The following account of the results of a laying competition will show what can be done by birds properly bred for utility purposes.

"The world's record for six months in laying contests has been broken at the Subiaco (Western Australia) competition by the Sunnyhurst pen of White Leghorns. The test commenced on July 1st, 1906, and on December 31st the South Australian birds had laid 874 eggs. The record up till then was 794, and was held by Wakfer's Langshans. This year Wakfer's Langshans pulled the record to 794, but from the way the Sunnyhurst birds were shaping over in the West, it was early seen that with ordinary luck they would easily beat these figures. The expected has happened, and not only has the record been broken, but a set of figures has been established that should stand for a long time to come. Allowing that to start on July 1st is to commence at a much

better time than April 1st; still, the scores put up are so remarkable, whatever the time of commencement, that it is a matter of congratulation to the breeder who put them up. The monthly scores of the Sunnyhurst birds were:—July, 139; August, 140; September, 150; October, 160; November, 140; December, 145; truly a remarkable effort on the part of these birds. The previous best, from any kind of fowl for six months was made at Lyndoch by W. A. E. Smith's runner ducks in the second half of 1905, and was 819, so that this score goes by the board also. Take the six months' period as 184 days, it will be seen that the Sunnyhurst team of six birds averaged 4.75 eggs per day, and it will probably be some time before the new record is beaten.

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## Cattle Judging.

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The disputes arising in connection with cattle judging at the local shows are largely due to a confusion in the classes, or where the classes are well defined, to the failure of some of the judges to conform to the standard of excellence for each breed as laid down by the Breeders' Associations.

Cattle may be roughly divided into the dairy, beef and dual-purpose classes. In general each breed falls naturally into one of these classes, but in some instances a breed is represented in two or all of the classes. The Shorthorn is the most noticeable breed in this particular. In the breed classes each animal is judged according to the standard of excellence for the breed, but where the class is based on the utility of the animal, such as in a general fatstock class, the breed standards are ignored, and the degree of perfection from the utility standpoint alone considered. It would be impossible to judge a Jersey cow and a Hereford cow according to the same standard or scale of points, although they could be placed somewhat in order of merit if each were judged according to its breed standard. Inasmuch as one is purely a beef breed and the other purely a dairy breed, it is highly improbable that they would in any way be brought into competition, except in small shows where the classes are often mixed without discrimination.





Aberdeen Angus Bull and Cow.

The illustrations of Ayrshire, Friesian, Jersey, and Guernsey animals indicate, more clearly than any description, the points regarded as essential in both the male and female representatives of a purely dairy breed, and it will be observed that there is a remarkable uniformity in form. The description of any of these breeds, after eliminating the purely breed points, would do as a standard on which to judge dairy animals in general, regardless of breed.

The same is true regarding the beef breeds, such as the Aberdeen-Angus, Galloway, Shorthorns (in general), and the Hereford.

In general the dairy breeds have the three wedge form (individuals, however, are often good milkers without this form being pronounced), that is, an increase in depth from the front backwards, an increase in width from the front backwards, and an increase in breadth from the withers downwards. The dairy breeds are angular, while the beef breeds are compact and parallelogrammic in shape. The dual purpose animal, while inclined to parallelogram in shape, is less massive, and slightly more angular than animals of the beef type, and smoother, larger, heavier and more evenly balanced than representatives of the dairy type. In the development of the udder, head, and neck, the dual-purpose animal resembles the dairy type.

The scale of points for each of the standard breeds commonly appearing in Rhodesian Show rings is submitted for the consideration of exhibitors and judges. With a recognised standard of excellence there would be more harmony between judges, and fewer objections by breeders.

The greater number of the photographs used as illustrations in connection with this subject were supplied through the courtesy of Messrs. Cooper and Nephews.—Reid Wishaw, Photographer.

### HEREFORD CATTLE.

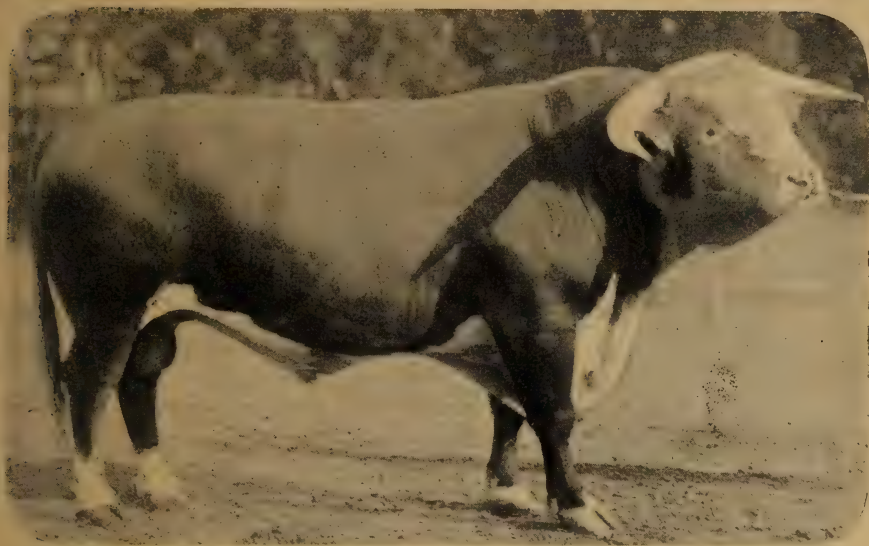
In the absence of an authorised scale of points the following is submitted by Prof. Shaw:—

I. *Size*—Relatively large, but medium for the breed.

(1) The fore and hind quarters should be equally well developed, but

(2) In many instances the hind quarter is relatively light.

(3) Compactness of form is desired in both sexes, but is more sought for in the male.



Hereford Bull and Cow.



II. *Head*—The head should be small in proportion to the substance of the body, clean cut and well set on, not coming out too low from the neck. In the bull it should be masculine, but finer in the female and not too long in either sex.

- (1) Forehead, broad between and above the eyes.
- (2) Face, slightly dished in the female and gently tapering below the eyes.
- (3) Nose, medium in size and straight, not too fine.
- (4) Muzzle, broad, dewy and cream coloured.
- (5) Nostrils, large and open.
- (6) Cheeks, not heavily fleshed nor coarse.
- (7) Eyes, large, full, calm, mild, and surrounded by a cream-coloured circle.
- (8) Ears, medium in size and thickness, well fringed, fairly erect and active.
- (9) Poll, broad and level.
- (10) Horns, springing out straightly from the poll, more than medium in length, flat at the base and of a yellow or white waxy appearance.
- (a) In the male the curve is in the form of a semi-circle.
- (b) In the female it is in the form of a graceful wave, with a slightly spreading upward tendency.

III. *Neck*—Medium in length, strong and arched in the male, but finer in the female and gradually widening and deepening and slightly rounding as it approaches the shoulder.

- (1) It should spring straight from the back, should set well into the shoulder and brisket, and should carry the head gracefully.
- (2) The throat should be clean cut and without dewlap, but frequently there is more or less of dewlap.

IV. *Body*—Long, broad, deep, not too long in the barrel, rectangular, almost a parallelogram and evenly covered with firm flesh.

- (1) Back, straight, wide and level from withers to tail-head, broad and well filled in the loin, and well fleshed throughout.
- (2) Withers, broad.
- (3) Shoulders fully developed and lying well within the body, blending nicely with the neck in front and crops behind, and well covered.
- (4) Forearm, strong and broad where it joins the body and tapering gracefully to the knee.
- (5) Breast, full, wide and deep.
- (6) Brisket, broad and plump, and often lower than in the Shorthorn.
- (7) Crops, full.
- (8) Ribs, springing well and level from the backbone, increasingly so toward the back rib, coming well down, and extending well forward and backward, as in the Shorthorn.
- (9) Heart girth and flank girth, good and about even.
- (10) Hind quarters, long and broad and deep, as in the Shorthorn.
- (11) Hips, broad and full and on a level with the back and loin.
- (12) Hind flank, full, thick and deep.
- (13) Thigh, broad, full and well fleshed within and without, but in many instances it is light.
- (14) Rump, broad, but not prominent, and on a line with the back.
- (15) Buttock, broad and square.
- (16) Twist, deep and full and placed low.
- (17) Tail, rather fine, somewhat broad at the top, set on a level with the back and falling in a plumb line to the hocks.



Red Polled Bull and Cow.

V. *Udder*—Broad, full and long and evenly quartered, but oftentimes it is not possessed of much capacity.

- (1) Teats of good size and well placed, as with the Shorthorn.
- (2) Milk veins, same as in the Shorthorn, but frequently they are lacking in large development.

VI. *Legs*.—Short and well placed under the body, fine and clean below the knee, and fine, clean and flat below the hock.

- (1) Hocks fairly straight and short, and turning neither outward nor inward
- (2) Feet, flat and in shape like a semi-circle.

VII. *Skin*.—Of medium thickness, but somewhat thicker than in the Shorthorn, mellow and elastic to the touch, and well covered with an abundance of fine, soft hair, in many instances more or less curled.

VIII. *Colour*.—In colour, the face, throat, chest, legs, lower part of the body, crest and tip of tail are a beautiful white, and all other parts are red.

- (1) The red should be neither very dark nor light.
- (2) A small red spot above the eye and a round red spot on the throat have many admirers.

IX. *General Appearance*.—Herefords are characterised by large, rectangular and yet compact development of body, smoothness of outline, mildness of mien, and easy carriage.

X. *Compared with Shorthorns*.—They have longer and more spreading horns, more dewlap, lower briskets, rather thicker hides, lighter thighs, more curly coats, and the differences in colour mentioned.

## SHORTHORNS.

In the absence of an authorised scale of points, the following is submitted:—

I. *Size*.—The size should be relatively large, but medium for the breed.

- (1) The fore and hind quarters should be equally well developed.
- (2) Compactness of form is more important in the male, but it is essential in the female as well.





Shorthorn Bull and Cow.

II. *Head*—Small in proportion to the size of the animal, clean cut, handsome and well set on, longer and narrower in the female, but stronger in the male.

- (1) Forehead, broad between the eyes.
- (2) Face, slightly dished in the female, and tapering gracefully below the eyes to the nostril.
- (3) Nose, medium in size and straight.
- (4) Muzzle, medium to broad, full and moist and flesh coloured.
- (5) Nostrils, large and fairly expansive.
- (6) Cheeks, not heavily fleshed, the lower jaw in the female thin.
- (7) Eyes, large, full, bright, intelligent, calm.
- (8) Ears, medium in size and thickness, well covered with soft hair, somewhat erect and possessed of an average amount of play.
- (9) Poll, fairly broad and level.
- (10) Horns, short but longer and finer in the female, flat rather than round at the base, spreading and curving gracefully forward, with a slightly downward or upward tendency, and of a creamy white or yellowish colour.

III. *Neck*—Medium in length, strong and arched in the male, but finer in the female, and gradually widening and deepening and slightly rounding as it approaches the shoulder.

- (1) It should spring straight from the back, should set well into the shoulder and brisket and should carry the head gracefully.
- (2) The throat should be clean cut and without dewlap.

IV. *Body*—Long, broad, deep, only moderately long in the coupling and rectangular, almost a parallelogram, and evenly covered with firm flesh.

- (1) Back, straight, wide and level from withers to tail-head, broad and well filled in the loin, and well fleshed throughout.
- (2) Withers, broad.
- (3) Shoulders, well developed and lying well within the body, blending nicely with the neck in front and crops behind and well covered.
- (4) Forearm, strong and broad where it joins the body and tapering gracefully to the knee.
- (5) Breast, full, wide and deep, and the chest capacious.
- (6) Brisket, broad and well rounded.
- (7) Crops, full.
- (8) Ribs, springing well and level from the backbone, coming well down, and so filling the space behind the shoulder and in front of the hooks, that the animal will appear straight and level from the shoulder to the buttock.
- (9) Heart girth and flank girth, good, and about equal.
- (10) Hind quarters, long and full from the hooks to the pin bones, deep throughout and broad in every part.
- (11) Hips, broad and on a level with the back and loin.
- (12) Hind flank, full, deep and thick.
- (13) Thigh, broad, full and well fleshed within and without.
- (14) Rumps, broad but not prominent.
- (15) Buttock, broad and square.
- (16) Twist, deep and full, and placed low.
- (17) Tail, rather fine, somewhat broad at the top, but level, set perpendicularly on a level with the back and not too much covered with hair.



Poll Durham Bull.



Lincoln Red Shorthorn Bull.



V. *Udder*—Broad and full, extending well forward along the belly and well up behind and evenly quartered.

(1) Teats of good size and squarely placed, well apart, and having a slight oblique pointing outward.

(2) Milk veins, large, tortuous and swelling, and with fairly large orifices leading into the body.

VI. *Legs*—Short, and well placed under the animal, fine and clean below the knee, and fine, clean and flat below the hock.

(1) Hocks, somewhat straight and short; and turning neither outward nor inward.

(2) Foot, flat, and in shape an oblong semi-circle.

VII. *Skin*—Of medium thickness, finer in the female, mellow and elastic to the touch, of a cream or orange colour, and well covered with an abundance of fine, soft hair.

VIII. *Colour*—The standard colours are red, white and roan.

(1) Red is most in favour, white is now considered objectionable, and red and white spots alternating are not in favour.

(2) All shades of roan are admissible, but red roan is preferred.

(3) The skin around the eye and bald of the nose should be a rich cream colour.

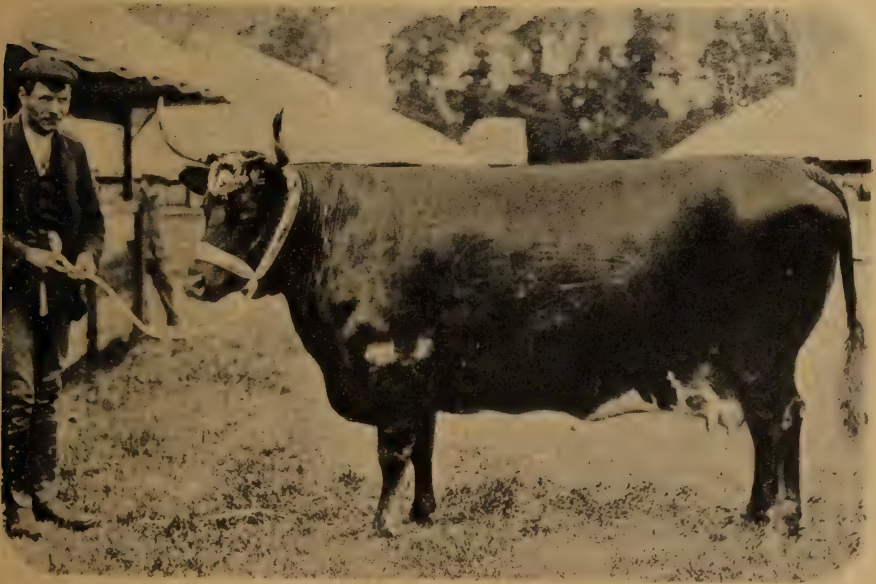
IX. *General Appearance*—Shorthorns should have large, rectangular and yet compact development of body, smoothness of outline, symmetry of form, and gracefulness of carriage.—“The Study of Breeds,” by Prof. Shaw.

## DEVON CATTLE.

I. The following scale of points was adopted by one Devon Cattle Club in 1886:—

### FOR COWS.

|  | COUNTS |
|--|--------|
| (1) <i>Head</i> —Moderately long, with a broad, indented forehead, tapering considerably toward the nostrils; the nose of a flesh colour, nostrils high and open, the jaws clean, the eye bright, lively and prominent, and surrounded by a flesh-coloured ring; throat clean, ears thin, the expression gentle and intelligent; horns matching, spreading and gracefully turned up, of a waxy colour, tipped with a darker shade. | 8      |
| (2) <i>Neck</i> —Upper line short, fine at head, widening and deep at withers and strongly set to the shoulder   | 4      |
| (3) <i>Shoulders</i> —Fine, flat and sloping, with strong arms and firm joints   | 4      |
| (4) <i>Chest</i> —Deep, broad, and somewhat circular in character  | 8      |
| (5) <i>Ribs</i> —Well sprung from the backbone, nicely arched, deep, with flanks fully developed   | 8      |
| (6) <i>Back</i> —Straight and level from the withers to the setting on of the tail, loin broad and full, hips and rump of medium width, and on a level with the back   | 16     |



Devon Bull and Cow.

|   | COUNTS |
|---|--------|
| (7) <i>Hindquarters</i> —Deep, thick and square .. .. .   | 8      |
| (8) <i>Udder</i> —Not fleshy, coming well forward in line with the belly and well up behind; teats moderately large and squarely placed .. .. .   | 20     |
| (9) <i>Tail</i> —Well set on at a right angle with the back, tapering, with a switch of white or roan hair, and reaching the hocks .. .. .  | 2      |
| (10) <i>Legs</i> —Straight, squarely placed when viewed from behind, not to cross or sweep in walking, hoof well formed .. .. .   | 4      |
| (11) <i>Skin</i> —Moderately thick and mellow, covered with an abundant coat of rich hair of a red colour; no white spot admissible, except the udder .. .. .                                 | 8      |
| (12) <i>Size</i> —Minimum weight at three years old, 1,000 pounds .. .. .   | 2      |
| (13) <i>General Appearance</i> —As indicated by stylish and quick movement, form, constitution and vigour, and the underline as nearly as possible parallel with the line of the back .. .. . | 8      |
| Perfection .. .. .  | 100    |

## FOR BULLS.

|   | COUNTS |
|---|--------|
| (1) <i>Head</i> —Masculine, full and broad, tapering toward the nose, which should be flesh-coloured; nostrils high and open, muzzle broad, eyes full and placid and surrounded with flesh-coloured ring, ears of medium size and thickness; horns medium size, growing at right angles from the head, or slightly elevated, waxy at base, tipped with a darker shade .. .. . | 10     |
| (2) <i>Cheek</i> —Full and broad at root of tongue, throat clean .. .. .  | 2      |
| (3) <i>Neck</i> —Of medium length and muscular, widening from the head to the shoulders, and strongly set on .. .. .  | 4      |
| (4) <i>Shoulders</i> —Fine, flat, sloping and well fleshed, arms strong with firm joints .. .. .  | 6      |
| (5) <i>Chest</i> —Same as in female .. .. .   | 10     |
| (6) <i>Ribs</i> —Same as in female .. .. .  | 10     |
| (7) <i>Back</i> —Same as in female .. .. .  | 20     |
| (8) <i>Hindquarters</i> —Same as in female .. .. .  | 12     |
| (9) <i>Tail</i> —Same as in female .. .. .  | 2      |
| (10) <i>Legs</i> —Short, then same as in female .. .. .   | 4      |
| (11) <i>Skin</i> —Moderately thick and mellow, covered with an abundant coat of rich hair of a red colour; no white spot admissible unless around the purse .. .. .   | 8      |
| (12) <i>Size</i> —Minimum weight at three years old 1,400 pounds .. .. .  | 4      |
| (13) <i>General Appearance</i> —Same as in female .. .. .   | 8      |
| Perfection .. .. .  | 100    |

## FRIESIAN CATTLE.

I. The following scale of points was drawn up by a Holstein-Friesian Association in 1885:—

## FOR BULLS.

|   | COUNTS |
|---|--------|
| (1) <i>Head</i> —Showing full vigour, elegant in contour .. .. .  | 2      |
| (2) <i>Forehead</i> —Broad between the eyes, dishing .. .. .  | 2      |
| (3) <i>Face</i> —Contour graceful, especially under the eye, medium in length, broad muzzle .. .. .                     | 2      |
| (4) <i>Ear</i> —Of medium size, fine, covered with soft hair .. .. .  | 1      |
| (5) <i>Eyes</i> —Moderately large, full and bright .. .. .  | 2      |
| (6) <i>Horns</i> —Medium in size, fine in texture, short, oval, inclining forward .. .. .                               | 2      |
| (7) <i>Neck</i> —Neatly joined to head and shoulders, nearly free from dewlap, of good length, proud in bearing .. .. . | 5      |
| (8) <i>Shoulders</i> —Of medium height, well rounded and even over tops .. .. .   | 4      |
| (9) <i>Chest</i> —Low, deep and full .. .. .  | 8      |
| (10) <i>Crops</i> —Full and level with shoulders .. .. .  | 4      |





Friesian Cow.

|  | COUNTS |
|--|--------|
| (11) <i>Chine</i> —Straight, broadly developed and open .. .. .  | 3      |
| (12) <i>Barrel</i> —Well rounded, with large abdomen .. .. .   | 6      |
| (13) <i>Loins and Hips</i> —Broad, full, long and level .. .. .  | 5      |
| (14) <i>Rump</i> —High, long, broad and level .. .. .  | 5      |
| (15) <i>Thurl</i> —High, with great width .. .. .  | 4      |
| (16) <i>Quarters</i> —Long, straight behind, wide and full at sides .. .. .  | 5      |
| (17) <i>Flanks</i> —Deep and full .. .. .  | 2      |
| (18) <i>Legs</i> —Short, clean, tapering, with strong arm, in position firm, wide apart, feet of medium size, round, solid, and deep .. .. .   | 6      |
| (19) <i>Tail</i> —Reaching to hocks or below, large at setting, tapering finely to a full switch .. .. .                                       | 2      |
| (20) <i>Hair and Handling</i> —Fine, soft and mellow, skin of moderate thickness, secretions oily and of a rich brown or yellow colour .. .. . | 10     |
| (21) <i>Mammary Veins</i> —Long, large, branched, with extensions entering large orifices .. .. .  | 10     |
| (22) <i>Rudimentary Teats</i> —Not less than four, large, well spread .. .. .  | 2      |
| (23) <i>Escutcheon</i> —Large and fine development .. .. .   | 8      |
| Perfection .. .. .   | 100    |

## FOR COWS.

|   | COUNTS |
|---|--------|
| (1) <i>Head</i> —Decidedly feminine in appearance, comparatively long from eyes to base of horns, fine in contour .. .. .   | 2      |
| (2) <i>Forehead</i> —Broad between the eyes, dishing .. .. .  | 2      |
| (3) <i>Face</i> —Contour fine, especially under the eyes, showing facial veins, length medium, broad muzzle .. .. .   | 2      |
| (4) <i>Ears</i> —Of medium size, fine, covered with soft hair .. .. .   | 1      |
| (5) <i>Eyes</i> —Moderately full, large and mild .. .. .  | 2      |
| (6) <i>Horns</i> —Set moderately narrow at base, fine, oval, well bent, inclining forward .. .. .   | 2      |
| (7) <i>Neck</i> —Fine, nearly free from dewlap, neatly joined to head and shoulders, top line slightly curving, of good length, moderately thin, elegant in bearing .. .. . | 4      |
| (8) <i>Shoulders</i> —Fine and even over tops, lower than hips, and moderately thick, deep and broad .. .. .  | 3      |
| (9) <i>Chest</i> —Low, deep and broad .. .. .   | 6      |
| (10) <i>Crops</i> —Full and level with shoulders .. .. .  | 2      |
| (11) <i>Chine</i> —Straight, broadly developed and open .. .. .   | 3      |
| (12) <i>Barrel</i> —Well rounded, with large abdomen .. .. .  | 5      |
| (13) <i>Loins and Hips</i> —Broad, full, long and level .. .. .   | 5      |
| (14) <i>Rump</i> —High, long, broad and level, with roomy pelvis .. .. .  | 4      |
| (15) <i>Thurl</i> —High, with great width .. .. .   | 4      |
| (16) <i>Quarters</i> —Long, straight behind, roomy in the twist, wide and full at sides .. .. .   | 4      |
| (17) <i>Flanks</i> —Fairly deep and full .. .. .  | 2      |
| (18) <i>Legs</i> —Short, clean, tapering, with strong arm, in position firm, wide apart; feet of medium size, round, solid, and deep .. .. .                                | 5      |
| (19) <i>Tail</i> —Reaching to hocks or below, large at setting, tapering finely to a full switch .. .. .  | 2      |
| (20) <i>Hair and Handling</i> —Fine, soft and mellow, skin of moderate thickness, secretions oily and of a rich brown or yellow colour .. .. .                              | 10     |
| (21) <i>Mammary Veins</i> —Large, long, crooked, branched with extensions entering large orifices .. .. .   | 10     |
| (22) <i>Udder</i> —Capacious, flexible, well developed both in front and rear, teats well formed, wide apart, and of convenient size .. .. .                                | 12     |
| (23) <i>Escutcheon</i> —Large and fine development .. .. .  | 8      |
| Perfection .. .. .  | 100    |



Jersey Bull and Cow.



## JERSEY CATTLE.

I. The following scale of points was adopted by the American Jersey Cattle Club, 1885:—

## FOR COWS.

|  | COUNTS |
|--|--------|
| (1) <i>Head</i> —Small and lean ; face dished, broad between the eyes and narrow between the horns . . . . . | 2      |
| (2) <i>Eyes</i> —Full and placid ; horns, small, crumpled and amber coloured . . . . .                       | 1      |
| (3) <i>Neck</i> —Thin, rather long, with clean throat, and not heavy at the shoulders . . . . .              | 8      |
| (4) <i>Back</i> —Level to the setting on of tail . . . . .   | 1      |
| (5) <i>Loins</i> —Broad across . . . . .   | 6      |
| (6) <i>Barrel</i> —Long, hooped, broad and deep at the flank . . . . .                                       | 10     |
| (7) <i>Hips</i> —Wide apart ; rump long . . . . .  | 10     |
| (8) <i>Legs</i> —Short . . . . .   | 2      |
| (9) <i>Tail</i> —Fine, reaching the hocks, with good switch . . . . .  | 1      |
| (10) <i>Hide</i> —Mellow, inside of ears yellow . . . . .  | 5      |
| (11) <i>Fore Udder</i> —Full in form and not fleshy . . . . .  | 13     |
| (12) <i>Hind Udder</i> —Full in form and well up behind . . . . .  | 11     |
| (13) <i>Teats</i> —Rather large, wide apart and squarely placed . . . . .                                    | 10     |
| (14) <i>Milk Veins</i> —Prominent . . . . .  | 5      |
| (15) <i>Disposition</i> —Quiet . . . . .   | 5      |
| (16) <i>General Appearance and Apparent Constitution</i> . . . . .   | 10     |
| Perfection . . . . .   | 100    |

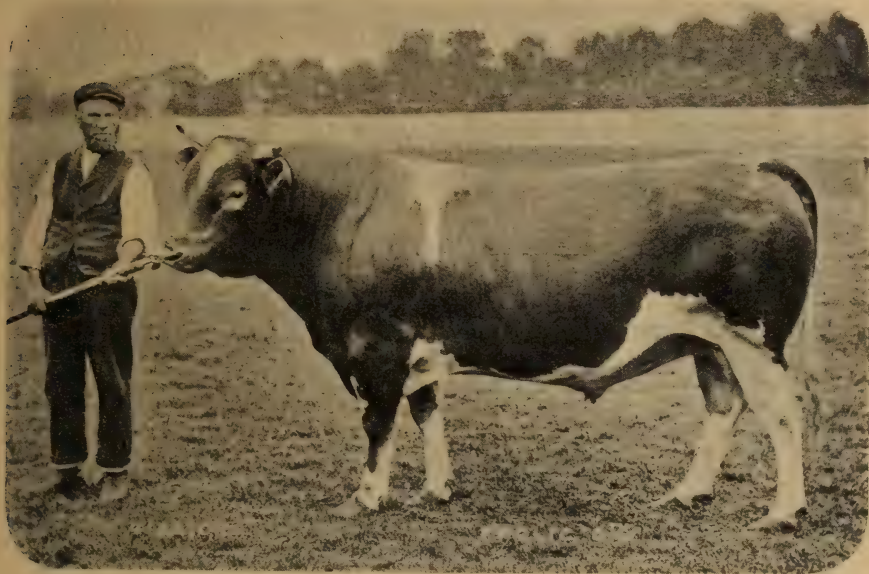
(17) In judging heifers, omit Nos. 11, 12 and 14.

## FOR BULLS.

(18) The same scale of points shall be used in judging bulls, omitting Nos. 11, 12 and 14, and making due allowance for masculinity ; but when bulls are exhibited with their progeny in a separate class, add 30 counts for progeny.

II. Additional particulars submitted by Prof. Shaw, though not given in the above scale :—

- (1) The head should incline to long from the eye to the muzzle.
- (2) Muzzle, black in colour and encircled with a band of a light colour.
- (3) Eyes, intelligent, liquid and rimmed with black above and below.
- (4) Horns, tipped with black.
- (5) Ears, inclining to small and well fringed with hair and possessed of considerable erection and movement.
- (6) Withers, fine and inclined to rise.
- (7) Back, frequently swayed, more or less, the spinal column prominent at the chine and open spaced, the pelvic arch somewhat elevated, and the crupper prominent with a downward slope toward the outer hips.
- (8) The junction of the neck is somewhat abrupt.
- (9) Breast, wide in lower front, but not full, and brisket V-shaped.
- (10) Chest, wide through the heart, but frequently it is not.
- (11) Forearm, long but not full.
- (12) Thighs, long, lean and incurved.
- (13) Escutcheon, well developed.
- (14) Udder, thinly haired and the veins covering it well defined.
- (15) Milk veins, long, tortuous, branched, and they should enter the body through two or more large milk wells.
- (16) Limbs, inclining to fine and placed well apart in front and behind.
- (17) Skin, inclining to thin and distinctively yellow at the armpits and around the udder.
- (18) Hair, abundant, sleek and fine.
- (19) The appearance when in milk should be spare.
- (20) The colour may include grey fawn and white, yellow fawn and white, silver grey dun, cream-coloured fawn and light silver and dark steel grey, solid colours with black points being formerly much in favour.



Guernsey Bull and Cow.

### III. Bulls contrasted with cows.

- (1) The head of the former is stronger, wider relatively, and shorter, and the horns are shorter, stronger and more upturned.
- (2) The neck is thicker and is arched.
- (3) The relative development of the forequarters is greater, more particularly at the withers, breast and through the heart.
- (4) The barrel is relatively shorter, the hide thicker and the limbs stronger.

IV. *General Appearance*.—In general outline the Jersey has a beautiful, deer-like form, a large body supported by fine, clean limbs, a small head, small and crumpled horns, large, lustrous and liquid eyes, and, when in milk, a decided inclination to sparseness in frame.

### AYRSHIRE CATTLE.

The following are the points of the Ayrshire cow and their values in judging in the show-ring, taken from a report by a committee of the Herd Book Society. The points of the bull differ from those of the cow only in the masculine characters, which, according to the general rule, ought to be distinctly defined.

|  |     |
|--|-----|
| (1) <i>Head</i> —Short ; forehead wide ; nose fine between the muzzle and eyes ; muzzle large ; eyes full and lively ; horns wide set on, inclining upwards .. .. .  | 10  |
| (2) <i>Neck</i> —Moderately long, and straight from the head to the top of the shoulder, free from loose skin on the under side, fine at its junction with the head, and enlarging symmetrically towards the shoulders .. .. .   | 5   |
| (3) <i>Forequarters</i> —Shoulders sloping ; withers fine ; chest sufficiently broad and deep to ensure constitution ; brisket and whole forequarters light ; the cow gradually increasing in depth and width backwards .. .. .  | 5   |
| (4) <i>Back</i> —Short and straight ; spine well defined, especially at the shoulders ; ribs short and arched ; body deep at the flanks ..   | 10  |
| (5) <i>Hindquarters</i> —Long, broad and straight ; hook-bones wide apart and not overlaid with fat ; thighs deep and broad (but thin of flesh on the inner thigh or twist) ; tail long, slender, and set on level with the back .. .. .   | 8   |
| (6) <i>Udder</i> —Capacious, and not fleshy, hinderpart broad (and rounded like the side of a cheese). The whole firmly attached to the body ; the sole nearly level, and extending well forward ; milk veins well developed ; teats from 2 to 2½ in. long, equal in thickness, and hanging perpendicularly ; distance apart, <i>at the sides</i> , equal to one-third of the length of the vessel, and <i>across</i> to about one-half of the breadth .. .. . | 33  |
| [Small teats are now considered most objectionable, both in the market and the show-ring.]   |     |
| (7) <i>Legs</i> —Short in proportion to size ; bones fine, and joints firm ..  | 3   |
| (8) <i>Skin</i> —Soft and elastic, and covered with soft, close, woolly hair ..  | 5   |
| (9) <i>Colour</i> —Red, of any shade, brown, or white, or a mixture of these—each colour being distinctly defined. Brindle, or black and white is not in favour .. .. .  | 3   |
| (10) <i>Average Live Weight</i> —In full milk, about 10½ cwt. .. ..  | 8   |
| (11) <i>General stylish appearance and movement</i> .. .. .  | 10  |
| Perfection .. .. .   | 100 |





Ayrshire Bull and Cow.

## Veterinary Notes.

By L. E. W. BEVAN, M.R.S.V.S.

### ROUP.

The inability of chicken owners to cope with the demand for eggs during the months of January, February, and March justifies the consideration of one, if not the chief of the numerous diseases which handicap the poultry industry in this country.

The ravages produced by the disease known as "Roup" are so great and of such economic importance that we reproduce at length some of the valuable information contained in a bulletin issued by the Ontario Agricultural College, which should prove of interest and value to poultry owners in Rhodesia. In this bulletin Professor F. C. Harrison and Dr. H. Streit describe the general condition of Roup birds as follows:—

"After the first symptoms of the disease, which is usually a putrid catarrh from the nostrils, the affected fowl is generally restless, separates from other members of the flock, becomes dull, cowers in the corner of the coop, or mopes in the corner of the pen, with its head drawn close to its body, and often covered with its wings. If there is a severe discharge from the nostrils or eyes, then the feathers upon the wings or back are likely to be smeared with it, stick together, and after some time fall out; and the eyes are often shut, the lids being glued together by the sticky discharge from them. A fowl in a sleepy condition, or moping as described, frequently rouses itself for a time, takes food, and especially water, and then gradually returns to the apathetic condition. Many fowls having the disease in a chronic form keep their normal appetite for a long time, and seem very little disturbed physically, whilst others, especially when the face or eyes are swollen, lose their appetite, grow thinner and thinner, and finally become too weak to stand or walk about, when they lie down and die in a few days. During the last stages, diarrhœa, with offensive yellow or green discharge, often sets in and causes death in a short time. Many poultry keepers assert that roup birds show fever, and it is certain that the head is very often hot, but the body temperature is normal, or only very slightly higher than normal."



Concerning the special symptoms of Roup they write :  
 " By the term ' Roup ' we generally understand a more or less putrid discharge from the nostrils, which lasts for weeks or even months. The disease often follows a common cold, to which fowls, especially young fowls and those of the more delicate breeds, are much pre-disposed. In the first stages of roup, the birds often cough and sneeze, and the breathing is noisy, caused by the partial closing of the air passages, which become blocked with the discharge from the nostrils. When the air passages are entirely closed by the discharged products, the fowl has to open its beak in order to breath. Sometimes a yellowish cheese-like mass forms in the nostrils, growing quickly and pressing the upper walls of the nose upwards, and if the mass is removed, an uneven bleeding surface is left, which forms a new cheesy mass in from twenty-four to forty-eight hours. Whilst many roup birds show only the above-mentioned symptoms, others become more seriously diseased. The face of roup birds is very often swollen, especially between the eyes and the nostrils; and this swelling, which is hot and sore, sometimes grows into a tumour as large as a walnut—generally firm and hard. A bird in this condition is frequently found scratching at the tumour with its claws or wings, as if endeavouring to remove it. If the tumour grows on the inner side, towards the nasal passage, it forces the roof of the mouth downwards, and the upper and lower beak are slowly pressed out of their normal position, so that the bird cannot close its mouth. On making an incision into the tumour, we find a solid, cheesy yellowish matter, which may be pulled out like the root of a plant; but it usually has to be broken into small pieces in order to get it out. Around this mass, there is a more or less smooth grey or brownish membrane that is capable of again forming a cheesy mass similar to what has been removed. The mass itself, when not attended to, often grows into the nasal canals, and blocks them up completely. Generally, combined with the tumour on the face, there is an affection of the eyes; or the eyes become diseased without the preliminary discharge from the nose, in which case poultry-keepers speak of fowls suffering from ' Roup of the Eyes.' "

" Roup of the Eyes."—The first symptoms of the eyes is generally an inflammation of the eyelids. These be-



come red, swollen, and hot; then the mucous membrane and glands of the eyes become inflamed and begin to secrete a liquid—at first clear, and then of a grey, slimy, putrid character. Occasionally the mucous membrane of the eye socket is the primary seat of the infection of the eye, and the eyelids swell as a secondary symptom. It is easy to understand that the eyes may become infected from the nasal cavity, as the eye socket has free connection, by means of the lachrymal canal, with the nasal cavity, and thus the diseased product from the nostrils can pass into the eye socket. The secretion from the eyes is similar to that described as coming from the nostrils, *i.e.*, at first a clear liquid, then changing to a grey, putrid, and offensive discharge, which dries on the feathers at the side of the head, causing them to stick together and fall out. If the secretion is retained in the eye socket, it undergoes a change, becoming a yellowish solid, cheesy mass, of the same appearance as that found in the nasal tumour. This cheesy mass either forces the eye out of the socket, or the inflammation entirely destroys it. These cheese-like masses form in one or two days, and may re-appear after many daily removals. All these affections, described above, may be localised on one side; but often both nasal passages and both eyes are affected at the same time. Combined with the symptoms of roup as above described, there often are patches of a greyish-yellow exudation firmly adherent to the mouth, throat, etc. These patches are called “false membranes”; and, on account of their somewhat close resemblance to the membrane which is formed in human diphtheria, it has been thought by some writers that the avian and the human disease are the same. Here, however, let it suffice to say that the weight of evidence is against the contention. We may also point out that many poultry-keepers who notice the false membrane on the throat and mouth of their fowls, regard the disease as quite different from the catarrhal form, and call it “canker,” which is probably a popular form of the word “cancer.” Whether the disease is characterised by false membranes, offensive discharge, or cheesy masses, the cause is the same, as we have many times experimentally demonstrated. At one or several places in the mouth or throat, these yellowish, smooth, or uneven membranes appear, and either remain small and disappear after a few days, or grow thicker, spread, and become firmly

attached to the mucous membrane: and if they (the false membranes) are removed, an uneven bleeding surface is exposed, which looks like true cancer. After the appearance of the membranes, the adjacent submucous tissue sometimes becomes inflamed, and finally the growths are found to be similar to those so often seen at the side of the face, containing cheesy solid matter in the centre. When the throat is blocked by these membranes the animal's breathing becomes abnormal, and the air passing through the throat produces loud noises. Gradually the visible mucous membrane and the comb turn blue, and the fowl finally dies from suffocation. The symptoms are much the same when the lungs are the seat of the disease. In dead roup-y fowls we have often found the higher bronchial tubes completely filled with solid cheesy matter, which prevented the air from passing into the lungs. Occasionally cheesy matters are found in the folds of the pleura, and in other situations.

A very important feature of the disease, and one which should be carefully considered, is that "the course of roup is usually of long duration. A simple, putrid discharge from the nose may stop in three or four weeks, and similarly false membranes may soon disappear; but generally the symptoms last for months." When the eyelids become swollen and tumours appear the case is usually chronic. Affected birds may be better for a few days or weeks, and then become very weak again. Damp cold weather usually intensifies the disease. It is well known that fowls may be more or less sick with roup for one or even several years; and these birds should have the greatest care and attention, for they are generally the cause of new outbreaks.

Experiments made at the Ontario Experimental Farm proved that healthy birds, which had never been exposed to infection caught the disease when confined in a coop with diseased birds. The experimentors also demonstrated that birds suffering from cold or other kindred complaints were more subject to infection than healthy birds. They state that "the roup germs seem capable of remaining in a sort of dormant condition in the depths of the tissues for a long time—so long that the fowls sometimes appear convalescent; suddenly, when the constitution is weakened by a cold or other cause, the roup germs become active and the roup-y symptoms re-appear."

While in the majority of outbreaks the disease is spread by sick fowls introduced into healthy flocks, it appears that apparently recovered birds are a fruitful source of infection. These contaminate the food-troughs and water, and generally disseminate the organism which, given a suitable host, weakened by unfavourable conditions, is capable of producing the disease and apparently gains in virulence by passage from bird to bird, thus giving rise to a malady of a very destructive nature.

Although various methods of treatment might be discussed as far as this country is concerned, it would be wiser to avoid them altogether and confine ourselves to prevention. Some careful work has been done by the Veterinary Department of this country in connection with this disease, and the following measures which should prevent the introduction of roup into healthy flocks, and should assist in eliminating the malady in the event of its gaining a footing, are to be recommended.

I. Frequently inspect the flock and remove any sick birds to a hospital situated in an isolated place, or better, destroy all birds that appear in ill health.

II. Never allow birds newly purchased to mix at once with the flock, but isolate them until it can be determined that they are free from disease. This refers particularly to the Native fowl—a common source of infection.

III. The poultry house should be situated in a sheltered spot upon soil which is well drained and dry; it should be warm, well ventilated but not draughty, and kept scrupulously clean.

IV. A plentiful supply of fresh water should always be available, and placed where it is not exposed to the direct rays of the sun. A drop or two of Izal may be added to every pint of water. This is a useful disinfectant, and is well tolerated by fowls. It may assist in preventing roup and other diseases such as cholera, worms, etc.

V. Should roup make its appearance, all the visibly sick birds must be immediately removed and isolated or destroyed. As we have said before, the latter course is to be recommended, and except where very valuable fowls are involved should always be adopted. To prevent the spread of infection it has been found advisable to place all in contact birds in a room or large box in which Formic aldehyde has been generated by heating Paraformaldehyde (dry Formalin tablets) in an Alformant lamp. The vapour thus formed, although irritating, is a strong



disinfectant producing antiseptic effects upon the respiratory passages. Several outbreaks have been successfully arrested by this agent, which being used with caution has produced none but good effects. The tablets and lamps can be procured at a reasonable price from most chemists in this country, but if they cannot be obtained a valuable alternative is to be found in the vapour of creosote or turpentine coming off in the steam of boiling water.

Another useful method of treating birds likely to be incubating roup is to paint their mouths and throats with a brush or feather saturated in pure eucalyptus oil. Several owners to whom this method has been recommended send us very satisfactory records of the results obtained.

VI. Houses, runs, feeding utensils, etc., likely to have been contaminated should be saturated with a disinfectant. For this purpose many of the spray pumps in common use are eminently suited, and we have found the "Success Spray Pump" fitted with a Bordeaux nozzle entirely satisfactory. In this connection we would point out the value of these pumps to the farmer. Not only can they be used for spraying cattle, and trees affected with insect pests and fungoid diseases, for disinfecting houses, stables, kraals, etc., but in emergency, the nozzle having been removed, they may be employed for administering enemata to horses, and for irrigating the vaginæ and wombs of cows which have experienced difficulty in parturition or have retained their foetal membranes. Indeed there are a hundred and one uses to which these inexpensive instruments can be put.

VII. Careful attention to feeding, housing, and general hygiene will produce a healthy condition of system which is nature's "first line of defence" against disease.

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### Correspondence.

TO THE EDITOR, "AGRICULTURAL JOURNAL."

SIR,—

*Re* the statement in Mr. Wise's Land Settlement Scheme to which "Novice" draws your attention concerning the number of calves produced by a hundred cows annually. I too think the "stock owner" considerably

over-estimates the general average. Of course I do not say it is not possible to get 80 to 90 per cent. or even 100 per cent. increase in stock annually, but my experience with both East African and Mashona cattle leads me to put the average annual *increase* at between 65 and 70 per cent.

The "stock owner" may be quite correct as to the average increase in *his* mob, but that is not the experience of stock breeders generally, I feel sure, and a statement like that getting into Mr. Wise's report which is likely to be read with interest in most parts of the British Empire, is to my idea misleading.

Apologising for encroaching to such an extent on your valuable time and space.

I am,

Yours faithfully,

RUSTICUS.

8.3.07.

Dixey, Charity, and Umtali Farms,  
Ischudizani Plateau,  
21st February, 1907.

TO THE EDITOR, "AGRICULTURAL JOURNAL."

SIR,—

I am afraid that the point raised by "Novice" will not be settled satisfactorily for some time yet; but, if you should consider my experience of any value, I am very pleased to give it.

The following data are from the time of the disappearance of the East Coast Fever, which left me but few head of cattle to observe:—

| Colour of Cow.             | Number<br>of<br>Calves. | Number of<br>Days between<br>Calving. | Percentage<br>Fat in<br>Milk. |
|----------------------------|-------------------------|---------------------------------------|-------------------------------|
|                            |                         |                                       | %                             |
| 1. White and Red ...       | 3                       | 360                                   | 4.5                           |
| 2. Black, White Belly ...  | 2                       | 376                                   | 4.3                           |
| 3. Deep Red ...            | 2                       | 398                                   | 4.25                          |
| 4. Black, little White ... | 2                       | 400                                   | 3.8                           |
| 5. Black ...               | 2                       | 406                                   | 3.75                          |
| 6. Deep Red ...            | 2                       | 463                                   | 3.5                           |
| 7. Black ...               | 2                       | 499                                   | 3.2                           |
| 8. Cream ...               | 2                       | 501                                   | 3.0                           |

A calf from No. 1 has likewise calved, at two years and three months, a good healthy calf, the mother's milk supply being good in quality and quantity.

It will be observed that the percentage of fat is in inverse ratio to the number of days between calving; a fact, I think, worth noticing.

Considering that so little is known of tropical physiology, of both animals and plants, and that, still less is known of the changes induced by such being brought under tropical influences; the pseudonym "Novice," will aptly apply to all of us farming in Rhodesia; and, if it is any satisfaction to us, will certainly apply to all whose knowledge has been gained outside latitude  $23^{\circ}$  north or south.

In the year 1878, when I first began to take a live interest in the question of breeding and cross-breeding, the report of a lecture given by Prof. Wetherell came into my hand, in which, speaking of grading cattle, he says:—

"Breeding from a bull and cow of similar type the progeny will be like, and of a higher degree: qualities are thus perpetuated and intensified in the offspring. Take a Shorthorn bull and represent his hereditary powers at 100: put this bull to a cow of totally different hereditary power, say equal to 60: the offspring would be reduced to 100 minus 60, equal to 40. Suppose the offspring to be a bull, both sire and offspring may appear equally perfect in form and general character—the hereditary transmission being as much greater in the former sire, as the proportion of 100 to 40; hence, the former would be, and is, much more valuable for breeding purposes than the latter. By breeding animals of similar type, the offspring will be likely to possess the same characteristics, with a greater power of hereditary transmission of this character of these characteristics. On the other hand, animals of opposite characters, mutually weaken each other's influence, and the offspring possess the power of a hereditary transmission in a reduced degree."

I am fully aware that since then much knowledge has been acquired, but without entering upon the subject of the individual attributes of the Chromosomes, the above may be accepted, for most practical purposes, as a clear and compact statement of the law by which the tendency



to strengthen hereditary transmission by coupling animals of different characteristics.

Such being the case with cattle whose environment has been the same for many generations past, what may we expect to occur to animals introduced to entirely new conditions, and conditions which obtain nowhere else outside the plateau of tropical Africa? True, it is only experience which will eventually settle the question, but, if we wish for an experience that is worth acquiring, and not an experience of mere chance which may in six or eight years hence show that we have done harm, we must notice most carefully the behaviour of each animal under the conditions obtaining, and note what influence or influences we may think are acting upon each animal.

The influence of colour is one to which I have given much attention during these last six years.

In the Nos. 1 and 8 in the above list, white greatly predominates, in fact, No. 8 may be considered as wholly white. I have noticed when the cattle come into the byre after a day's hot sun that these two are always the most distressed, and upon taking their temperatures I have found them generally above normal, to be again normal in the morning, the black and red cows being scarcely affected. In all countries the lowering effect of a day's hot sun upon the percentage of the fat in milk is appreciable; here is no exception, but with the two cows, *i.e.* (1 and 8), it is abnormal, amounting to much over 1·25 per cent.; hence, if the standard of 3 per cent. were a rule, the milk of cow No. 8, although pure, could not be sold for ordinary consumption. I conclude to breed out all the white colour, and, of course, not to again introduce it by other bulls which will be coming here.

Yours obediently,

MATTHEW W. WHITE.

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SIR,—

Some time ago I noticed in the *Agricultural Journal* that pears would not flourish in this country. I am sending you by to-day's parcel post a sample of a William's pear grown by myself on unirrigated ground at Clonsilla. This is now the third year that the tree has borne, and

though the quantity borne is not great, yet I think in size and quality they cannot be surpassed.

Yours, etc.,

GEORGE HURTZIG.

Box 28, Gwelo.

[This pear was pronounced excellent eating.—Editor.]

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Mr. Hurtzig in a later communication gives the following brief information about his pear trees:—

“I might mention that the tree is planted in ordinary granitic soil, in a three foot hole, and beyond plentiful cultivation and a supply of stable manure and lime, I have done nothing to it. A peculiar thing happened, however, to an Easter Beurre pear tree about seven years old that I have. In planting it out two winters ago I did not notice that one of the branches had got broken in travelling. This branch bore flowers and fruit, but unfortunately a heavy wind broke it off before ripe. The tree has not borne since, but I have ringed some of the branches now, and if you wish I will report on it next season. This might possibly furnish a clue to an expert nurseryman or orchardist as to the reason of the majority of pear trees not bearing in this country.”

[It will be interesting to hear the result of this treatment on the productivity of the pear tree. This instance of successful cultivation will, it is hoped, encourage people with trees in their orchard to persevere in endeavouring to bring them into bearing.—Editor.]

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## **Epitome of Cattle Inspectors' Returns.**

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DECEMBER, 1906.

SALISBURY.

*African Coast Fever.*

Fresh Outbreaks: None.

Existing Outbreaks: No deaths.

*Horse Sickness.*

Two deaths.

*Rabies.*

Two Rabid dogs destroyed.

*General.*

Several head of cattle and two donkeys died from Arsenical poisoning.

In making *post-mortem* examinations on sheep at various farms G.V.S. Bevan has in several instances found a tape-worm in the bile ducts of the liver.

## BULAWAYO.

*African Coast Fever.*

Fresh Outbreaks: None.

Existing Outbreaks: No deaths.

*Rabies.*

Three rabid dogs destroyed in Bulawayo. G.V.S. Edmonds reports that the reported cases are nothing in number to those that actually occur, and are not reported, and instances the case of a pig and a cat which went mad, he was informed, six weeks after being bitten. Also the case of a farmer losing thirteen sheep. One of these, originally bitten by a native dog, developed symptoms of Rabies and bit others in which Rabies subsequently developed.

At Colonel Napier's Farm "Lancaster," Insiza District, seven head of cattle died, and the symptoms shown leave very little doubt that Rabies was the cause. On the Essexvale Estate, part of which is only a few miles from Lancaster, five head of cattle died from Rabies.

*Glanders.*

The following animals were tested with Mallein on importation and found healthy:—Horses, 7; Mules, 43; Donkeys, 41.

*Epizootic Lymphangitis.*

One mule quarantined as suspected of being affected with this disease released.



## UMTALI.

### *African Coast Fever.*

Fresh Outbreaks: None.

Existing Outbreaks: No deaths.

### *Pyæmia.*

One horse released. This animal had been in quarantine for over two years.

### *Rabies.*

Mr. Strickland destroyed one of his mules as being affected with Rabies.

### *Scab.*

Fresh Outbreaks: None.

Existing Outbreaks: Eleven flocks remain in quarantine.

### *Mange.*

One donkey remains in quarantine.

## GWELO.

### *African Coast Fever.*

Fresh Outbreaks: None.

Existing Outbreaks: No deaths.

### *Horse Sickness.*

One horse contracted this disease and recovered.

## VICTORIA.

### *African Coast Fever.*

Fresh Outbreaks: None.

Existing Outbreaks: No deaths.

Observation of the cattle removed from Concentration Camp No. 1 was continued during the month. Several deaths from poverty and poisoning occurred. Smears forwarded from two suspicious cases showed no sign of Coast Fever. If the veld on which these cattle are now is perfectly clean I am confident we have seen the last of Coast Fever amongst them.

*Rabies.*

A rabid dog was destroyed at Morgenster Mission Farm. A suspected rabid dog was seen in Victoria. It unfortunately escaped.

## ENKELDOORN.

*Rabies.*

Several rabid dogs reported by natives all destroyed. One rabid dog destroyed in township after biting several animals. A beast died at Mr. Meikle's farm, near Charter, from Rabies. A rabid dog was destroyed some time ago in the cattle kraal.

## INYANGA.

Three rabid dogs destroyed.

## RUSAPI.

One rabid dog destroyed.

## MELSETTER.

*African Coast Fever.*

Fresh Outbreaks: G.V.S. Jarvis destroyed a suspected beast on the farm "Fortune"; *post-mortem* examination did not reveal any definite lesions of Coast Fever, nor did microscopic examination of blood films show any piroplasmids. It was considered advisable, however, to regard the outbreak as Coast Fever, and the herd (23 in all) was removed to clean veld under the usual precautions.

Existing Outbreaks: On investigation of the suspected outbreaks at Mr. Brent's farm referred to last month, G.V.S. Jarvis reported that he considered Coast Fever did not exist.

*Scab.*

One flock placed in quarantine.

## GENERAL.

*African Coast Fever.*

Total deaths during month, 1; do. last year (doubtful), 8.

J. M. SINCLAIR,

Chief Veterinary Surgeon.

JANUARY, 1907.

SALISBURY.

*African Coast Fever.*

Fresh Outbreaks: None.

Existing Outbreaks: No deaths.

*Rabies.*

One Mule proved rabid.

Native dog No. 4343 (Hartley) destroyed by constabulary. European bitten.

One rabid dog and three in-contacts shot at B.S.A. Police Camp.

*General.*

The lung disease of calves which prevailed in 1905 again made its appearance on the North-West area of the Commonage, complicated with acute Redwater.

BULAWAYO.

*African Coast Fever.*

Fresh Outbreaks: None.

Existing Outbreaks: No deaths.

*Rabies.*

Three rabid dogs reported.

One dog suspected to be rabid shot at Inyati.

The Government Veterinary Surgeon reports that, in his opinion, "the Insiza and Belingwe Districts are the worst infected places at the present time. If reports are true these places are just full of rabid dogs going all over the place."

*Glanders.*

The following animals were tested with Mallein:—  
Horses, 1; Mules, 30.

*Epizootic Lymphangitis.*

No cases.



## UMTALI

### *African Coast Fever.*

Fresh Outbreaks: None.

Existing Outbreaks: No deaths.

### *Rabies.*

Two fresh cases occurred during the month. The two worst centres being the Old Umtali Township and the Penhalonga mining area. Umtali Township remains fairly clean.

### *Pyæmia.*

No cases.

### *Scab.*

No fresh outbreaks. Ten flocks in quarantine.

### *Mange.*

One donkey in quarantine.

## GWELO.

### *African Coast Fever.*

Fresh Outbreaks: None.

Existing Outbreaks: No deaths.

## VICTORIA.

### *African Coast Fever.*

Fresh Outbreaks: An outbreak occurred at the Morgenster Mission farm among a herd of 72 head of cattle belonging to a native "Bunga."

Existing Outbreaks: No deaths.

### *Scab.*

Exists among various native flocks.

## ENKELDOORN.

### *Rabies.*

Three dogs and one horse destroyed.

## INYANGA.

### *Rabies.*

One suspected case. Native bitten.

## LOMAGUNDI.

*Rabies.*

Two rabid dogs destroyed.

## MELSETTER.

*African Coast Fever.*

Fresh Outbreaks: None.

Existing Outbreaks: No deaths.

*General.*

A disease locally termed "Stiffsickness," and first reported in North-Western Rhodesia, has made its appearance in the following districts:—Plumtree, Matobo, Mangwe, and Selukwe, in Matabeleland; Victoria and Charter Districts in Mashonaland. The following are the principal symptoms:—

"Dullness, loss of appetite, eyes sunken in the head, breathing quickened, saliva dribbling from the mouth in the early stages, tympanites. Animals inclined to lie down. Marked stiffness and lameness, particularly in the hind quarters. Seat of stiffness or lameness well marked by a swelling at the joints. Animals constipated, continually straining; faces covered with mucus; animals in great pain, which G.V.S. Edmonds attributes to the swelling of the joints, not to say disturbance in the digestive tract. None of the reports give any temperature records."

It is stated that in one district over 50 per cent. of the cattle have been affected. The mortality is practically nil, one farmer had over a hundred cases without a death. After a dose of opening medicine animals seem to recover rapidly. A few deaths have been reported. Those were attributed to choking through drenching. The popular opinion is that the disease is due to the veld. This season, especially in Matabeleland, there have been early and heavy rains followed by a period of drought, during which the grass dried up; heavy rains fell subsequently, and the veld came on most luxuriantly.

J. M. SINCLAIR,

Chief Veterinary Surgeon.

FEBRUARY, 1907.

SALISBURY.

*African Coast Fever.*

Fresh Outbreaks: None.

Existing Outbreaks: No deaths.

*Rabies.*

Three rabid dogs destroyed in the Township.

*Biliary Fever.*

Two horses died.

*Horse Sickness.*

Three mules died.

*Calf Disease.*

Eight deaths from the lung disease referred to last month, complicated with Redwater, diarrhoea and ordinary pneumonia.

BULAWAYO.

*African Coast Fever.*

Fresh Outbreaks: None.

Existing Outbreaks: No deaths.

*Rabies.*

One rabid dog destroyed in the Township; one rabid dog destroyed at Helenvale; one rabid dog destroyed at Bembesi. Two pigs affected with rabies died at Shiloh.

*Glanders.*

The following animals were tested with Mallein on importation and found healthy:—Horses, 29; Mules, 42; Donkeys, 34.

UMTALI.

*African Coast Fever.*

Fresh Outbreaks: None.

Existing Outbreaks: No deaths.

*Horse Sickness.*

Four Mules and one horse died.



*Rabies.*

One rabid dog destroyed.

*Scab.*

One fresh outbreak. Eleven flocks under licence.

GWELO.

*Rabies.*

One suspected rabid dog destroyed.

VICTORIA.

*African Coast Fever.*

Fresh Outbreaks: The disease appeared at three kraals about seven miles from Bungu's Kraal, where an outbreak occurred in January. These outbreaks were the result of the removal of cattle from Bungu's Kraal. A cordon of police has been placed round the infected area. All the infected herds, and all cattle within three miles of the infected centres are being moved through a temperature camp to clean veld.

Number of Deaths: 38.

Existing Outbreaks: The 300 head of cattle moved from the infected area in December last remain healthy.

ENKELDOORN.

*Rabies.*

Two rabid dogs destroyed. These dogs were bitten by a rabid dog on 31st December last.

*Horse Sickness.*

One horse died.

MELSETTER.

*African Coast Fever.*

Fresh Outbreaks: None.

Existing Outbreaks: Two deaths at the farm "Nooitgedacht." The remainder of the herd, five head, was removed to clean veld.

INSIZA.

*Rabies.*

One rabid dog destroyed. Three rabid donkeys destroyed. Two of these animals had been bitten about a month previously by a rabid dog.

## INYANGA.

*Rabies.*

One rabid dog destroyed.

## CHIBI.

*Rabies.*

One rabid dog destroyed.

*General.*

Stiff-sickness is reported from every district south of Salisbury, but few deaths are recorded.

J. M. SINCLAIR,

Chief Veterinary Surgeon.

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## Market Report.

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|                 | Bulawayo.    | Salisbury.   | Johannesburg. | Kimberley.   |
|-----------------|--------------|--------------|---------------|--------------|
| Mealies :       |              |              |               |              |
| White ... ..    | 18/6         | 11/- to 11/6 | 10/9 to 11/9  | 10/9 to 11/3 |
| Yellow ... ..   | 14/-         | —            | 10/3 to 11/-  | 12/3 to 12/6 |
| Kafir Corn      | 9/- to 10/-  | 13/- to 14/- | 9/- to 11/9   | 9/- to 11/6  |
| N'yauti ... ..  | 9/- to 10/-  | 12/6 to 13/- | ...           | ...          |
| Oat Hay ... ..  | 10/-         | 10/- to 12/6 | 6/3 to 7/3    | 5/9 to 6/3   |
| Grass Hay :—    |              |              |               |              |
| Per ton ... ..  | 45/- to 54/- | ...          | ...           | ...          |
| Per bale ... .. | ...          | 2/6 to 6/-   | 1/2 to 1/7    | ...          |
| Rapoko ... ..   | ...          | 10/- to 12/- | ...           | ...          |

*Bulawayo.*—Demand and supply of white mealies moderate. Fair demand for yellow mealies, but supplies in excess. Very little business doing in Kafir corn. Oat hay, quality good, and all locally grown. Grass hay: New crop now being sold.

*Johannesburg.*—The demand for mealies is poor, and there are still fairly large supplies held.

*Kimberley.*—There is a fair demand for good Sugar Beans, but prices quoted down Colony are too high for this market.

## Rainfall.

STATEMENT OF RAINFALL RECORDED AT VARIOUS STATIONS IN  
SOUTHERN RHODESIA DURING THE MONTHS OF JANUARY  
AND FEBRUARY, 1907.

COMPILED BY THE STATIST.

| NAME OF STATION.                    | JANUARY. |                          |                                       | FEBRUARY. |                          |                                       |
|-------------------------------------|----------|--------------------------|---------------------------------------|-----------|--------------------------|---------------------------------------|
|                                     | Amount.  | No. of<br>Rainy<br>Days. | Greatest<br>Amount<br>in<br>24 hours. | Amount.   | No. of<br>Rainy<br>Days. | Greatest<br>Amount<br>in<br>24 hours. |
| <b>MASHONALAND.</b>                 |          |                          |                                       |           |                          |                                       |
| Ayrshire Mine ... ..                | 5'91     | 15                       | 1'11                                  | ...       | ...                      | ...                                   |
| Borrowdale ... ..                   | 5'62     | 11                       | 1'86                                  | 20'71     | 26                       | 2'45                                  |
| Charter ... ..                      | 5'04     | 15                       | 1'20                                  | 12'09     | 19                       | 2'15                                  |
| Chilimanzi ... ..                   | 7'72     | 17                       | 2'02                                  | 12'06     | 21                       | 2'27                                  |
| Chishawasha ... ..                  | 9'63     | 14                       | 1'44                                  | 18'09     | 26                       | 2'79                                  |
| Driefontein, Blinkwater ... ..      | 6'36     | 15                       | 1'56                                  | 14'49     | 18                       | 3'04                                  |
| Enkeldoorn ... ..                   | 3'97     | 14                       | 1'44                                  | 12'12     | 20                       | 1'70                                  |
| Experimental Farm, Salisbury ... .. | 4'00     | 8                        | 1'42                                  | 18'14     | 25                       | 3'85                                  |
| Gutu ... ..                         | 4'65     | 15                       | 1'06                                  | ...       | ...                      | ...                                   |
| Gwebi Forest Reserve ... ..         | 4'35     | 9                        | 1'36                                  | 16'79     | 21                       | 2'79                                  |
| Helvetia, South Melsetter ... ..    | 8'26     | 17                       | 1'46                                  | ...       | ...                      | ...                                   |
| Hospital, Salisbury ... ..          | 4'13     | 12                       | 1'01                                  | 16'88     | 25                       | 4'10                                  |
| Inyanga ... ..                      | 7'39     | 11                       | 1'34                                  | ...       | ...                      | ...                                   |
| Marandellas ... ..                  | 5'74     | 14                       | 1'07                                  | 14'12     | 23                       | 2'72                                  |
| Macheke ... ..                      | 4'65     | 9                        | 2'05                                  | 9'97      | 21                       | 1'16                                  |
| Melsetter ... ..                    | 7'15     | 17                       | 1'47                                  | ...       | ...                      | ...                                   |
| M' Rewa ... ..                      | 6'83     | 14                       | 1'90                                  | 16'33     | 21                       | 4'27                                  |
| Mount Darwin ... ..                 | 11'85    | 15                       | 2'35                                  | 6'83      | 21                       | 1'35                                  |
| Progress Farm, Marandellas ... ..   | 5'81     | 14                       | 1'59                                  | 17'27     | 22                       | 1'93                                  |
| Public Gardens, Salisbury ... ..    | 4'78     | 10                       | 0'93                                  | 15'60     | 24                       | 3'14                                  |
| Rusapi ... ..                       | 3'33     | 14                       | 0'86                                  | 11'73     | 25                       | 2'20                                  |
| Sinoia ... ..                       | 6'16     | 14                       | 1'51                                  | 13'74     | 24                       | 1'65                                  |
| Sipolilo ... ..                     | 7'08     | 13                       | 1'55                                  | 8'99      | 22                       | 1'20                                  |
| Umtali ... ..                       | 5'24     | 15                       | 1'11                                  | ...       | ...                      | ...                                   |
| Utopia, Umtali ... ..               | 4'53     | 14                       | 0'85                                  | ...       | ...                      | ...                                   |
| Victoria ... ..                     | 5'27     | 15                       | 1'27                                  | 12'62     | 18                       | 2'65                                  |
| Westridge, Salisbury ... ..         | 4'72     | 11                       | 0'91                                  | 15'72     | 25                       | 3'07                                  |
| <b>MATABELELAND.</b>                |          |                          |                                       |           |                          |                                       |
| Bulawayo ... ..                     | 3'48     | 19                       | 0'72                                  | ...       | ...                      | ...                                   |
| Filabusi ... ..                     | 5'16     | 12                       | 1'20                                  | ...       | ...                      | ...                                   |
| Fort Rixon ... ..                   | 5'04     | 11                       | 1'85                                  | ...       | ...                      | ...                                   |
| Government House, Bulawayo ... ..   | 3'68     | 14                       | 1'46                                  | ...       | ...                      | ...                                   |
| Gwanda ... ..                       | 5'81     | 12                       | 1'07                                  | ...       | ...                      | ...                                   |
| Gwelo ... ..                        | 4'94     | 16                       | 0'87                                  | 4'38      | 21                       | 0'86                                  |
| Hopefontain ... ..                  | 5'38     | 13                       | 1'73                                  | 8'51      | 17                       | 2'43                                  |
| Inyati ... ..                       | 4'89     | 12                       | 0'85                                  | 5'19      | 11                       | 1'11                                  |
| Matopos ... ..                      | 5'22     | 10                       | 1'88                                  | 7'40      | 16                       | 1'56                                  |
| Rhodes Matopo Park ... ..           | 3'56     | 6                        | 1'65                                  | ...       | ...                      | ...                                   |
| Sebungwe (Kariyangwe) ... ..        | ...      | ...                      | ...                                   | 10'59     | 10                       | 2'05                                  |
| Selukwe ... ..                      | 7'66     | 14                       | 1'22                                  | ...       | ...                      | ...                                   |
| Shiloh ... ..                       | 3'82     | 9                        | 1'40                                  | 7'65      | 15                       | 1'40                                  |
| Tegwani ... ..                      | 7'23     | 11                       | 2'29                                  | 6'01      | 9                        | 2'11                                  |
| Tuli ... ..                         | 3'15     | 8                        | 1'26                                  | 5'35      | 11                       | 1'85                                  |
| Victoria Falls ... ..               | 4'18     | 12                       | 1'42                                  | 7'59      | 15                       | 1'95                                  |

All other Stations send no report.

SALISBURY, 11th March, 1907.



## Government Notices.

No. 42 of 1907.

Department of Agriculture,

Administrator's Office,

Salisbury, 28th February, 1907.

### RABIES.

**U**NDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby declare and make known that, on and after the 15th day of March, 1907, all and singular the Government Notices regarding the disease of Rabies now subsisting and in force in this Territory are hereby cancelled and repealed, except as to acts done or penalties incurred at the date of the coming into force of this Notice, and except as to officers appointed under Government Notice No. 286 of 1906, whose appointments shall remain valid for the purposes of this Notice, and in lieu thereof the following regulations shall have full force and effect:—

1. All and several the various Native Districts of Southern Rhodesia are hereby declared to be areas infected with the disease of Rabies.

2. Subject to any penalty a dog owner may have incurred under Government Notice No. 285 of 1906 by not registering his dog before the 1st day of February, 1907, the owner of any unregistered dog liable to registration may register the same at any time after the said date.

3. On and after the date of this Notice becoming operative the owner of every dog arriving at the age of three months, and the owner of every dog imported into Southern Rhodesia after that date shall register such dog with an official appointed for the purpose, provided that this provision shall not apply to any Municipality, Township or similar area in which provision for registration exists and is duly enforced.

4. A registration badge shall be issued for each and every dog registered, and the said badge must be attached to a proper and sufficient collar to be supplied by the owner, which must be placed and kept on each dog registered.

5. A fee to cover the cost of registration and supply of the badge in the amount of sixpence will become demandable and payable on registration of each dog.

6. Any dog found at large after the date of this Notice becoming operative, not having and bearing a registration badge duly issued by an official or the local authority, may be summarily destroyed by any person.

7. Every dog shall be kept muzzled with a standard wire muzzle made according to the pattern lodged with each Magistrate and Assistant Magistrate, and open to inspection on application to him, or with a muzzle sufficient to prevent its biting or injuring any person or other animal with its teeth, or shall be secured in an enclosure or by chain in such a manner that it shall not have access to persons or animals nor other animals access to it.

8. Every dog found at large after the 15th day of March, 1907, not being sufficiently muzzled, may be summarily destroyed by any person, and the owner or person responsible for the custody of such dog shall be liable to the penalty hereinafter prescribed.

9. Any Magistrate, Police Officer, Native Commissioner, Government Veterinary Surgeon or other official vested with the performance of functions under the Animals Diseases Consolidation Ordinance, 1904, may, on it appearing to him that any dog or other animal is showing symptoms which justify investigation as to whether such dog or animal is suffering from rabies or not, order the proper detention, isolation and control of such dog or animal either in the hands of the owner or at some other suitable place.

10. Should any dog show symptoms which lead to the suspicion that such dog may be suffering from rabies, the owner thereof shall forthwith notify the fact to the nearest official vested with powers under these regulations, who shall immediately report same to the Chief Veterinary Surgeon, and shall either destroy the said dog or isolate and secure it for further observation.

11. On its appearing that any animal is actually suffering from rabies, any of the above-mentioned officials may order the destruction of such animal, or may himself destroy it and may further take control of or destroy, if deemed necessary, any animal which has been in contact with a rabid animal or an animal suspected of being rabid.

12. The carcases of all animals destroyed on account of their being infected with rabies shall be thoroughly burnt by the person or official destroying them, save that such parts as may be required for scientific investigation may be retained under proper precautions. In any case in which a human being has been bitten by a rabid animal, the head of such animal shall, if possible, be taken and sent to the nearest Veterinary Official.

13. Any person contravening any of the above regulations or failing to carry out any of the provisions thereof shall be liable on conviction to a fine not exceeding £10 for each offence or in default of payment to imprisonment with or without hard labour for a period not exceeding one month.

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No. 237 of 1906.

#### GAME LAW CONSOLIDATION ORDINANCE, 1906 : CLOSE SEASON, &c.

**U**NDER and by virtue of the powers conferred upon me by the "Game Law Consolidation Ordinance, 1906," I do hereby cancel and withdraw all notices relating to game preservation and issued in terms of "The Game Preservation Ordinance, 1899," and declare the following to be of force and effect in lieu thereof :—

#### CLOSE SEASON.

1. In the whole of Southern Rhodesia, the close season for game in Class "A" shall be from 1st November to 30th April in each year.

2. In the whole of Southern Rhodesia, the close season for game in Class "B" shall be from 1st December to 30th June in each year.

3. Up to 31st March, 1908, the following game shall be strictly protected and not hunted or destroyed within the respective areas mentioned :—

- (a) Oribi, within the magisterial district of Charter.
- (b) Grysbok, within the magisterial district of Bulawayo.
- (c) Koorhaan, throughout Southern Rhodesia, except the magisterial districts of Charter and Victoria.
- (d) All game within the limits of the commonages or townlands of Salisbury, Bulawayo, Umtali, Gwelo and Enkeldoorn.

4. The operation of Section 12 of the said Ordinance shall be suspended in regard to Class "A" up to 31st December, 1907, and Class "B" up to 30th June, 1907, from date hereof within the magisterial district of Melssetter.

5. That the operations of Sections 5 and 12 of the said Ordinance shall be suspended in regard to all game in Classes "B" and "C," except Ostrich, Elephant, Zebra, Hippopotamus, Rhinoceros, black and white; and all such of the Antelope species as are not contained in Classes "B" and "C" of the said Ordinance within the limits described in the schedule hereto, as to the districts of Hartley and Lo Magondi.

6. All game is strictly preserved and shall not be hunted or destroyed until further notice within the following area, which is declared a game sanctuary :—

An area in the Urungwe Sub-district of the District of Lo Magondi in the Province of Mashonaland, bounded as follows :—

On the North and West by the River Zambesi, starting at the point where the Lozenzi River joins the Zambesi and following the course of the latter river to its junction with the Sanyati River.

On the East by an imaginary line drawn from the junction of the Indurume and the Nyaodsa Rivers to the headwaters of the Lozenzi River and thence along the course of the Lozenzi River to its junction with the Zambesi River.

On the South by an imaginary line drawn due West from the point of junction of the Indurume and Nyaodsa to the Sanyati River, thence along the course of this river to where it enters the Zambesi.

#### SCHEDULE.

1. Hartley District.—Along the North side of the Railway from Umfuli Bridge to Umzwezwe Bridge, thence along the Umzwezwe River to its junction with the Umnyati, thence along the Umnyati to its junction with the Umfuli, along the Umfuli to its junction with the Umsengezi, up the Umsengezi to the Hartley-Lo Magondi footpath crossing near Madzorera Kraal, thence along the Hartley-Lo Magondi footpath to Umfuli Bridge.

2. The whole of the Lo Magondi district except within the limits declared a game sanctuary under Section 6 hereof.

No. 187 of 1906.

26th July, 1906.

#### IMPORTATION OF CATTLE.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby declare and make known that notwithstanding any general prohibition against the importation of cattle into this Territory such importation will be allowed under the following conditions :—

1. Cattle *bona fide* required for breeding purposes may be introduced from the Cape Colony provided that the permission of the Chief Inspector of Cattle is first obtained.

2. Every application for such permission shall be accompanied by a certificate in form A hereunto annexed.

3. Cattle introduced from the Cape Colony shall have not more than two permanent central incisor teeth: they shall be introduced by rail only and shall upon and after arrival at the importer's farm or at their destination be effectually isolated from all other cattle for such period as may be directed by the Chief Inspector of Cattle.

4. Cattle may be imported from North-Eastern Rhodesia provided that

(a) The permission of the Chief Inspector of Cattle be first had and obtained, which permission the said official shall have full discretion to refuse.

(b) All cattle be introduced by way of the port or town of Feira, which is hereby declared a port of entry for cattle, and taken to Sipolilos.

(c) Such cattle be submitted for inspection and passed by a duly authorised officer at Feira and at Sipolilos and such inspection be noted on the permit originally granted.

5. On and after the 1st day of November, 1906, Cattle may be imported from North-Western Rhodesia provided that,

(a) The permission of the Government Veterinary Surgeon at Bulawayo be first had and obtained, which permission the said official shall have full discretion to refuse.

(b) All Cattle imported shall be conveyed by the shortest possible route to the Railway Station at Victoria Falls, which is hereby declared a port of entry for cattle, and shall there be entrained and conveyed by rail to the centre of consumption.

(c) On arrival at their destination such cattle shall be subject to all the regulations controlling the movement and disposal of slaughter cattle.



6. Every application for permission to introduce cattle from North-Eastern and North-Western Rhodesia shall be accompanied by a certificate in the form B annexed to this notice.

7. Cattle may be imported from Great Britain or Ireland, provided

- (a) That every animal so imported is accompanied by a proper and satisfactory certificate signed by a qualified Veterinary Surgeon that such animal was submitted to and resisted the tuberculin test for tuberculosis either before being embarked or upon arrival in port, or
- (b) That if such certificate be not produced every animal so imported shall be submitted to such quarantining and testing for tuberculosis as may be directed or approved by the Chief Inspector of Cattle.
- (c) That in the event of any test ordered and made disclosing the existence of tuberculosis the animal infected shall not be removed alive from the place where quarantined, but shall be there killed, and the owner shall be allowed to deal with the carcase as he may deem fit except that he shall not without special permission from a Government Veterinary Surgeon allow the meat to be used for human consumption.
- (d) And that all of expenses of inspection, quarantine, testing, destruction or disposal shall be borne by the owner of such cattle.

8. Any person introducing cattle into Southern Rhodesia otherwise than in accordance with these regulations or submitting any certificate false in any material particular or refusing or neglecting to submit cattle introduced to proper inspections and tests, or failing to properly isolate such cattle when introduced shall be liable to a fine not exceeding £10 for every animal in connection with which the offence complained of is committed and in default of payment of any fine inflicted to imprisonment with or without hard labour for any period not exceeding three months and the cattle in regard to which the complaint has been laid and proved shall be liable to destruction without compensation.

#### ANNEXURE "A."

I certify that the animals enumerated below have been in my possession since birth, and that Lung sickness, Contagious Pleuro-Pneumonia or any other contagious or infectious disease has not existed amongst any of my cattle or on my farm within the last three years, and that such cattle in travelling to..... Station will not come in contact with any animals amongst which Lung sickness or any other infectious or contagious disease has existed during that period.

Signature.....

The above mentioned facts are to my knowledge true and correct.

Date.....

..... District.

Resident Magistrate.

Cape of Good Hope.

Number of Animals..... Bulls..... Heifers.....

Breed.....

Seller's name and address.....

Purchaser's name.....

Placed in Rhodesia to which animals are being sent.....

## ANNEXURE "B."

I certify that the animals enumerated below have been in my possession for twelve months, and that no case of Lungsickness or other contagious disease has occurred amongst them or other cattle with which they have been in contact, and that in travelling to Feira (or Victoria Falls) they will not come in contact with any cattle amongst which Lungsickness or other contagious disease has existed during the last two years.

Signature.....

The above mentioned facts are to my knowledge true and correct.

Magistrate, District Commissioner, or J.P.  
N.E. Rhodesia.  
N.W. Rhodesia.

Date..... District.....

Number of Animals..... Bulls..... Cows.....

Heifers..... Bullocks.....

Breed.....

Seller's name.....

Purchaser's name.....

Place in Southern Rhodesia to which

animals are being sent.....

No. 188 of 1906.

26th July, 1906.

## AFRICAN COAST FEVER.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel and withdraw the regulations promulgated by Government Notices Nos. 264 of 1905 and 164 of 1906 and declare the following to be of full force and effect in lieu thereof within the Province of Matabeleland, exclusive of the District of Gwelo as described and defined by section 4 (c) of the "Southern Rhodesia Boundary Regulations Amendment Regulations, 1898," which area is hereby declared to be an area infected with a destructive disease and is hereinafter called the said area.

1. No cattle shall be moved from any other part of the Territory of Southern Rhodesia into the said area.

2. The movement of cattle to, from or across any defined area appearing in the schedule hereto or any area which may hereafter be added to that schedule so long as such area remains in and is not withdrawn from the schedule is absolutely prohibited save and except as is provided for in sections 3, 6 and 7 of these regulations.

3. The movement of all cattle within the said area is prohibited save and except

- (a) On permission granted by an Officer specially authorised thereto by the Administrator.
- (b) Within the boundaries of any single farm where such cattle are de pastured.
- (c) Within an area of land enclosed by a substantial fence.
- (d) Within a radius of four miles of any native kraal situate within the boundaries of any Native Location or Reserve, and as is hereinafter further provided.

4. The movement of cattle for slaughter, *bona fide* farming, mining or breeding purposes or for private milk supplies shall be permitted under the written authority of an official thereto duly authorised subject to the following terms and conditions :

- (a) That cattle are moved to the nearest or most suitable railway station or siding, and thence by rail to their destination, or, where the district is not served by a railway by the most suitable route to their destination, all cattle travelling by road shall be under the personal supervision of a responsible white man approved of by the Cattle Inspector or of a native approved of by the Native Commissioner and the Cattle Inspector of the district within which the movement takes place.
- (b) That written permission of owners, occupiers or managers of all occupied land, and in the case of Native Reserves, of the Native Commissioner of the District over which such cattle shall pass to the nearest station, siding or destination is obtained ; provided that in the event of such owners, occupiers, managers or Native Commissioner refusing to grant such permission, the Controller of Stock may direct the issue of a permit of removal, if satisfied that the necessary permission is withheld without good and sufficient cause.
- (c) That such cattle shall before being moved, be thoroughly disinfected by dipping or by spraying to the satisfaction of the Officer issuing permit, and at the expense of the owner of such stock, and if intended for slaughter shall where possible be branded under the supervision of the Officer issuing permit with the letters " V.D. " on the near side of neck.
- (d) That cattle intended for slaughter shall, on arrival at destination subject to the terms of clause (e) hereof, be immediately taken to the prescribed quarantined area and there be quarantined and confined, and where not branded in terms of clause (c) hereof, be similarly branded under the supervision of a duly authorised officer.
- (e) That all cattle intended for slaughter brought to their destination and not disinfected by dipping or spraying in terms of clause (c) hereof shall be immediately taken to the public dipping station and there be thoroughly dipped or sprayed before being taken to the quarantine area.
- (f) That all cattle admitted to the quarantine area shall be slaughtered within twenty-one days of their admission, and under no pretext whatever shall cattle so admitted be permitted to leave the said area alive ; all such cattle shall after admission to the said area be considered as likely to be infected with disease and if found wandering outside the said area or in possession of any person may be destroyed under an order of the Chief Inspector or Controller of Stock.
- (g) That on arrival at destination cattle other than slaughter cattle shall be dipped or sprayed and shall be effectually isolated from all other cattle on the same land for a period of four weeks.

5. The movement of working cattle may be permitted under the following conditions only :—

- (a) Within a radius of six miles of any working mine or mine in course of development for the purposes of such mine, provided that such cattle shall only be moved under a permit of a duly authorised officer, and shall be dipped every fourteen days or where no dipping tank is available be thoroughly sprayed with an approved dip, provided further that such permission shall not be granted when it conflicts with any other section of these regulations, or if such movement is considered dangerous to other cattle within the six mile radius.
- (b) Within the said area from private farms and trading stations to any centre of consumption or to a Railway Station or Siding within the said area under the permit of a duly authorised officer, which permit shall fully set forth the route to be traversed, provided that no such permit shall be issued until the person applying for same shall produce the written consent of the owners, occupiers or managers of occupied lands proposed to be traversed, and, in the case of Native



Reserves, of the Native Commissioner, and that such cattle shall before being moved be thoroughly disinfected by dipping or spraying at the expense of the owner and to the satisfaction of the Officer issuing the permit; provided further that in the event of such consent being unreasonably withheld, the Controller of Stock may direct the issue of a permit.

6. In the event of the failure of pasturage or water on land on which cattle are located, the movement of such cattle will be permitted, provided :—

- (a) That such movement shall be to nearest available pasturage by the most suitable route.
- (b) That written consent be obtained in terms of Section 4 (b) hereof.
- (c) That movement shall be by permit only of a duly authorised officer, and under the supervision of a responsible white man, or of a native approved of by the Cattle Inspector and Native Commissioner of the district.

7. For the purposes of cleansing an area from disease the Controller of Stock may, on the authority of the Administrator and on the advice of the Chief Inspector of Cattle, and subject to such conditions as may be stipulated, permit the removal of cattle from a scheduled area to an adjacent clean area.

8. All applications for the removal of cattle under sections 4 and 5 hereof shall be submitted to and approved of by the Veterinary Department before being granted and when such movement is from one Native District to another the application shall be submitted for the approval of the Government Veterinary Surgeon at Bulawayo and the Native Commissioners of the Districts to and from which the removal is made.

9. All permits granted under the provisions of this notice shall specify the number and brands of cattle, route to be traversed, and time allowed for each journey; any breach of these or other conditions endorsed on the permit by the issuing officer shall be deemed a contravention of these Regulations in terms of section 14 hereof.

10. All veld-fed animals within the limits of the various Commonages or Townlands or other centres where there is common grazing ground, and wherein cases of African Coast Fever have occurred within two years of the date of publication hereof, and upon which public dipping tanks have been established, shall be dipped therein at least once every fourteen days: provided that the Controller of Stock may, on the advice of the Veterinary Department, direct the temporary suspension of this regulation for such reasons as he may regard as sufficient.

11. The following charges shall be paid at the time of dipping by the owner of the cattle or other animals required to be dipped under these Regulations in respect of any dipping done at a public dipping tank :—

|                                   |               |
|-----------------------------------|---------------|
| For cattle (over six months)      | 3d. per head. |
| For horses and mules              | 3d. „         |
| For calves (six months and under) | 2d. „         |
| For small stock                   | 1d. „         |

with a minimum charge of 6d. for any number of animals not aggregating such fee under above tariff.

12. Any disinfecting by spraying required to be done under these regulations shall be carried out with an approved insecticide by the owner of the animals so sprayed; provided that the Inspector may, at his discretion, carry out such disinfection with the assistance of and at the entire cost of the owners of the animals to be sprayed, the cost of such disinfection being payable at the time of the spraying.

13. Whenever the owner, occupier, or manager of a farm shall adopt measures for the cleansing of his cattle running thereon, either by spraying or dipping or by any other method permitted by these or any other regulations, the Cattle Inspector may order such natives or others as have cattle on the said farm to cleanse such cattle, and the Native Commissioner of the District in which such farm is situated may enter into an arrangement with the native owners of cattle to cleanse such cattle at a charge to be mutually agreed between the said owner, occupier, or manager and the said native owners.

14. Any person contravening any of the provisions of these regulations shall, upon conviction, be liable in respect of each offence to the fines and punishments prescribed by the Ordinance, and in cases where no special punishment is provided, to a fine not exceeding £20, or in default of payment to imprisonment with or without hard labour for any period not exceeding three months, unless the penalty be sooner paid.

#### SCHEDULE.

- (1) Fingo Location.
- (2) An area within a radius of ten miles of Ntolas Kraal on the farm Emangeni.
- (3) An area comprising the farms Upper and Lower Umvutcha, Reigate, Upper Nondwene, Mapane, Government Farm No. 5, Trenance and the plots adjoining the farms Umvutcha.

No. 189 of 1906.

26th July, 1906.

#### AFRICAN COAST FEVER.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel and withdraw the regulations promulgated by Government Notices Nos. 223 of 1905 and 115 of 1906, and declare the following to be of full force and effect in lieu thereof within the Province of Mashonaland and the Fiscal Division of Gwelo as defined by the "Southern Rhodesia Boundary Regulations Amendment Regulations, 1898," which areas are hereby declared to be areas infected with a destructive disease:—

1. The movement of all cattle within the said area is prohibited save and except:—

- (a) On permission granted by an officer specially authorised thereto by the Administrator.
- (b) Within the boundaries of any single farm where such cattle are depastured.
- (c) Within any area of land enclosed by a substantial fence.
- (d) Within a radius of four miles of any native kraal situate within the boundaries of any native location or reserve and as is hereinafter further provided.

2. The movement of cattle for slaughter purposes shall be permitted under the written authority of an officer thereto duly authorised, subject to the following terms and conditions:—

- (a) That such cattle are moved to the nearest or most suitable railway station or siding, and thence by rail to the centre of consumption; or, where the district is not served by a railway, by the most suitable route to the centre of consumption, all cattle travelling by road to be under the personal supervision of a responsible white man approved of by the Cattle Inspector, or of a native approved of by the Native Commissioner and the Cattle Inspector of the district within which such movement takes place.
- (b) That the written permission of owners, occupiers or managers of all occupied land, and, in the case of Native Reserves, of the Native Commissioner of the District over which such cattle shall pass to the nearest station, siding or centre of consumption is obtained: provided that in the event of such owners, occupiers, managers, or Native Commissioners refusing to grant such permission, the Controller of Stock may direct the issue of a permit of removal if satisfied that the necessary permission is withheld without good and sufficient cause.
- (c) That such cattle shall, before being moved, be thoroughly disinfected by dipping, or spraying, to the satisfaction of the officer issuing permit, and at the expense of the owner of such stock; and where possible, be branded under the supervision of the officer issuing permit with the letters "V.D." on near side of the neck.

- (d) That such cattle shall, on arrival at the centre of consumption, subject to the terms of Clause (e) hereof, be immediately taken to the prescribed quarantine area and there be quarantined and confined and, where not branded in terms of Clause (c) hereof, be similarly branded under the supervision of a duly authorised officer.
  - (e) That all cattle brought into any centre of consumption and not disinfected by dipping or spraying in terms of Clause (c) hereof shall be immediately taken to the public dipping station and there be thoroughly dipped or sprayed before being taken to the quarantine area.
  - (f) That all cattle admitted to the quarantine area shall be slaughtered within twenty-one days of their admission, and under no pretext whatever shall cattle so admitted be permitted to leave the said area alive. All such cattle shall, after admission to the said area, be considered as likely to be infected with disease, and, if found wandering outside the said area or in possession of any person, may be destroyed under an order of the Chief Inspector or Controller of Stock.
3. The movement of cattle required for *bona fide* mining, farming, breeding and dairying purposes, and for private milk supplies, may be permitted on the written authority of a duly authorised officer, subject to the following terms and conditions:—
- (a) That such movement shall take place subject to the conditions set forth in Section 2, clauses (a), (b) and (c): provided that it shall not be necessary to brand such cattle as required by Clause (c).
  - (b) That on arrival at destination such cattle shall be effectually isolated from all other cattle on the same land for a period of four weeks.
  - (c) That the consent in writing to such movement be obtained from all owners of cattle on farms adjoining that to which movement takes place, and in the case of Native Reserves, of the Native Commissioner of the district, provided that should such consent be unreasonably withheld by any of the aforesaid persons, the Controller of Stock may direct the issue of a permit.
  - (d) That such cattle required for breeding and dairying purposes or for private milk supplies, when moved to within the boundaries of the various commonages, town lands, or of grazing land common to any mining camp or other centre where cases of African Coast Fever have occurred within two years, shall, if deemed necessary by the Chief Inspector of Cattle, be confined in some enclosed place approved of by the local Cattle Inspector, and, if a case of African Coast Fever occur in such enclosure, shall not be liberated therefrom except in terms of Section 4, Clause (b) hereof, until twelve months after the last occurrence of African Coast Fever within the enclosure in which they are kept, nor shall they be allowed after liberation to run upon any of the land specified herein, unless such land has been free from African Coast Fever for a period of twelve months.
  - (e) All cattle introduced in terms of the preceding Sub-section (d) shall, on arrival, if not previously disinfected in terms of Section 2, Clause (c), be taken direct to the Government dipping station and dipped or sprayed.
  - (f) All cattle confined in terms of this section and all calves born within the said enclosures shall be sprayed every fourteen days as may be directed by the Cattle Inspector.
  - (g) No cattle shall be moved from one Native District to another unless with the permission of the Chief Inspector of Cattle and the Native Commissioners of the districts to and from which such movement takes place.
4. All calves under twelve months old running within the boundaries of the various commonages, town lands, or on grazing ground common to any mining camp or other centres where cases of African Coast Fever have occurred within twelve months of the date of these regulations, or born thereon after such date, shall be removed to some enclosed place approved of by the local Cattle Inspector, and shall not be liberated or allowed to run at large on such commonage, town lands or common grazing ground until twelve months



after the occurrence of the last case of African Coast Fever within the enclosure in which they are confined or upon such commonage, town lands or common grazing ground.

- (a) No calves shall be permitted to accompany working cattle travelling, and all calves born of such working cattle whilst travelling shall not be removed from the place where born.

5. For the purpose of cleansing an area of disease, the Controller of Stock may, under the authority of the Administrator and on the advice of the Chief Inspector of Cattle, subject to such conditions as may be stipulated, permit the removal of calves and other cattle to an adjacent clean area.

6. The movement of working cattle other than those specified in Section 7 hereof, may be permitted within the following areas and on the terms and conditions hereinafter set forth :—

- (a) Within a radius of ten miles of any working mine, or mine in course of development, for the purposes of such mine : provided that

- (1) Such cattle shall only be moved under permission of a duly authorised Officer, and shall be dipped every fourteen days where a dipping tank is available within such area, or, in the absence of a dipping tank, be thoroughly sprayed with an approved insecticide ;
- (2) That such permission shall not be granted where it conflicts with any other section of these regulations, or, if such movement is considered to be dangerous to other cattle within the ten mile radius.

- (b) Within the boundaries of the following Native Districts, viz., Lomagundi, Marandellas, M'Rewas, M'Tokos, Makoni, Hartley, Inyanga, North and South Mazoe, Charter and Gwelo, as defined by Government Notice No. 13 of 1899, and from the farms "Shitowa" and "Soul Prop" to the Chiodzani Drift situate in the Umtali District, for *bona fide* farming purposes, subject to the following conditions :—

- (1) That the movement will be permitted for such period as the Controller of Stock may in his discretion, and on the advice of the Chief Inspector of Cattle, deem expedient, provided that such permission may at any time be withheld or withdrawn without notice.
- (2) That all applications for removal shall be approved of by the Chief Inspector of Cattle and the Native Commissioner of the District.
- (3) That the consent of owners, occupiers or managers of occupied lands, or Native Commissioners is obtained in terms of Section 2, Clause (b).
- (4) That all such cattle are dipped every fourteen days, where a tank is available, or, in the absence of a tank, are thoroughly disinfected by spraying.

7. The movement of "salted" or immune working cattle shall be permitted on the following terms and conditions :—

- (a) That such cattle have been registered and branded under the supervision of the Cattle Inspector with the brand "T.O." on near shoulder and the registration number on near horn, in terms of Section 7, Clauses (a) and (b) of Government Notice No. 109 of 1905.
- (b) That the movement of such cattle shall only take place under the written permit of a duly authorised officer and subject to the condition that they are disinfected by dipping every fourteen days, where a dipping tank is available, or in the absence of a dipping tank, by thorough spraying with an approved insecticide.
- (c) That movement of such cattle shall only be permitted :—

- (1) From the area comprised within the boundaries of the farms Mount Pleasant, Rhino Valley, Cheshire, Doorn Hoek, Vlaknek, Turner's and Sterkstroom in the Inyanga District, along the main road, between that area and the Rusapi Railway Station, provided that such cattle are dipped at Inyanga Police Station every fourteen days, and are not outspanned within a limit of four miles of Rusapi Station.

(2) Along the main roads between the Old Umtali Township, the Penhalonga Mine and Umtali.

(3) Along the main road from Umtali to Melsetter and Mount Silinda and all confluent roads on the infected area.

8. In the event of failure of pasturage or water on land on which cattle are located, the movement of such cattle will be permitted, provided :

(a) That such movement shall be to the nearest available pasturage by the most suitable route.

(b) That written consent be obtained in terms of Section 2, Clause (b) hereof.

(c) That such movement shall be by permit only of a duly authorised officer, and under the supervision of a responsible white man, or of a native approved of by the Cattle Inspector and Native Commissioner of the District.

9. All applications for the removal of cattle under Sections 2, 3 and 8 hereof shall be submitted to and approved of by the local Veterinary Officer before being granted.

10. All permits granted under the provisions of this Notice shall specify the number and brands of cattle, route to be travelled and time allowed for each journey, and all conditions endorsed on such permits by the officer issuing the same shall be strictly observed.

11. All veld-fed animals within the limits of the various Commonages or Town Lands or other centre where there is common grazing ground and wherein cases of African Coast Fever have occurred within two years hereof, and upon which public dipping tanks have been established, shall be dipped therein at least once every fourteen days : provided that the Controller of Stock may, on the advice of the Veterinary Department, direct the temporary suspension of this regulation for such reasons as he may regard as sufficient.

12. The following charges shall be paid at the time of dipping by the owner of the cattle or other animals required to be dipped under these regulations in respect of any dipping done at a public dipping tank :—

For Horned Cattle (6 months and over) .. .. 3d. per head.

For Horses and Mules .. .. 3d. „

For Calves (6 months and under) and Donkeys .. 2d. „

For Small Stock .. .. ½d. „

with a minimum charge of 6d. for any number of animals not aggregating such fee under above tariff.

13. Any disinfecting by spraying required to be done under these regulations shall be carried out with an approved insecticide by the owner of the animals so sprayed : provided that the Inspector may, at his discretion, carry out such disinfection with the assistance of and at the entire cost of the owner of the animals sprayed, the cost of such disinfecting being payable at the time of spraying.

14. Whenever the owner, occupier or manager of a farm shall adopt means for cleansing his cattle running thereon, either by spraying or dipping or any other method permitted by these or any other regulations, the Cattle Inspector may order such natives or others as have cattle on the same farm to cleanse such cattle, and the Native Commissioner of the district in which such farm is situated may enter into an arrangement with the native owners of cattle to cleanse such cattle at a charge to be mutually agreed upon between the said owner, occupier or manager and the said native owners.

15. Any person contravening the provisions of these regulations shall be liable to the punishments prescribed by the Ordinance, and in cases where no special punishment is prescribed by the said Ordinance to a fine of £20 or to three months' imprisonment with or without hard labour in default of payment of any fine inflicted.

## Departmental Notices.

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### DESTRUCTION OF WILD CARNIVORA.

It is hereby notified for public information that commencing on 15th June, 1906, rewards will be paid for the destruction of wily carnivora, within the limits of Southern Rhodesia, on the following terms and conditions, viz. :

£2 10s. each for Lions.

£1 each for Leopards and Cheetahs.

10s. each for Wild Dogs.

5s. each for Jackals, Tiger Cats and Redcat or Lynx.

2s. 6d. each for Baboons.

1s. each for Grey Monkeys.

Rewards will be paid to Europeans by the Magistrate or Native Commissioner, and to natives by the Native Commissioner of the District.

In proof of destruction, applicants for rewards will be required to produce and surrender the skulls of lions and the tail and skin of head and neck of other animals destroyed. Of young animals, where the tail is less than six inches in length, the complete skin must be produced.

Applicants must be prepared to make a solemn declaration to the effect that the animals for which rewards are claimed have been captured and killed within the boundaries of the district of Southern Rhodesia wherein the claim is made and subsequent to June 15th, 1906.

### FARM APPRENTICES.

The Secretary for Agriculture would be glad to receive the names of farmers who would be willing to receive young Englishmen desirous of obtaining acquaintance with local systems of agriculture before taking up land on their own account, and also the terms on which such would be received, as he is in constant receipt of enquiries for such employment.

### STRYCHNINE.

Stockowners can obtain a limited quantity of strychnine for the destruction of carnivora at a cost of 1s. 6d. per half ounce.



## DONKEYS.

The B.S.A.P. Transport Department offer two pure-bred Zanzibar donkey stallions for service. Stud fee, ten shillings. Further particulars may be obtained from the O.C., Transport, Salisbury.

## GOVERNMENT STALLIONS FOR PUBLIC STUD.

The stallions "Robber Knight," and "Dolfos" having been secured for public stud purposes in the Provinces of Matabeleland and Mashonaland respectively, will be stationed at Bulawayo and Salisbury, where a limited number of mares can be served free of charge.

Applications, giving full particulars of the mares to be served, should be addressed to the Veterinary Officers at Bulawayo and Salisbury, from whom further particulars can be obtained.

The owners of mares brought to stud will have to make all necessary arrangements for attendance, stabling and feeding of their animals, as the Department can take no responsibility whatever.

As the number of mares which can be served is very limited, the Veterinary Officers in charge are instructed to refuse service if any mare submitted is suffering from any hereditary disease or is of an inferior type.

## VAPORITE.

The new preparation, "Vaporite," suitable for the destruction of cut-worms, wire-worms, white ants, and other soil-infesting pests, can be obtained from the Department in quantities of not less than 2 cwt. at 17s. 6d. per cwt. Application to be accompanied by remittance covering cost and transport charges.

## GRAM.

A limited quantity of fresh imported seed is available at 3½d. per lb. on application to the Department, accompanied by remittance for cost and transport.

## PRIZE COMPETITION FOR RHODESIAN GROWN TOBACCO LEAF.

The following prizes are offered by the British South Africa Company to be awarded for the best crops of tobacco leaf grown each season during the two years, 1907 and 1908.

1. For Rhodesian grown leaf from Turkish seed and cured in the usual Turkish manner.

(a) Best crop weighing between one thousand and five thousand pounds: £25

(b) Best crop weighing five thousand pounds and over: £75.

2. For Rhodesian grown leaf from American seed and flue cured.

(a) Best crop weighing between one thousand and five thousand pounds: £25.

(b) Best crop weighing five thousand pounds and over: £75.

### CONDITIONS OF COMPETITION.

1. All competing crops must be cured, dried, packed in bales and delivered for sale at one of the Company's warehouses in Rhodesia.

2. Picked or selected exhibits representing but a portion of a crop cannot enter for competition.

3. Any or all competing crops may be disqualified by the Judges, if in their opinion they are not properly packed or in keeping condition.

4. Two Judges, both expert tobacco leaf men, will be appointed, one to be nominated by the British South Africa Company, and the other by the Rhodesian Agricultural Union. If necessary, an Umpire may be nominated by the Judges.

5. No competitor shall enter for both prizes in the same class.

6. All competing crops shall be the product of the season in which they are entered for competition.

7. Crops can be lodged at one of the Company's warehouses, which will be advertised later, any time during the season up to the end of December, but notice of intention to enter for competition should be sent to the Agricultural Department at as early a date as possible, and not later than 31st October in each year.

## Editorial Notices.

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Original subscribers to the *Journal*, who have complete sets of the earlier numbers to dispose of, are requested to communicate with this office, as numerous enquiries for the first and second volumes, now out of print, have been received.

Subscriptions to the *Journal* (5s.), issued bi-monthly, should be addressed to the paymaster, Agricultural Department, Salisbury. Only communications relating to the literary department should be addressed to the Editor, and if an answer is required in the pages of the *Journal*, should reach this office not later than the 15th of the month preceding publication. Charges for the insertion of advertisements will be forwarded upon application to the paymaster. Subscribers are requested to notify immediately the non-delivery of the *Journal*.

Farmers requiring latest market prices for produce and live stock at Kimberley, Johannesburg, Bulawayo, Gwelo, Salisbury, Umtali, and Beira, can obtain same from this office by next mail or prepaid wire.

Advertisements will be accepted from *bona fide* farmers wishing to effect sale, purchase or exchange of produce, live stock, or farm implements, at a minimum charge of 2s. 6d. per insertion of 20 words. Extra words will be charged for at the rate of 1s. for every ten words.

Messrs. Hart and Co., Parker's Buildings (P.O. Box 898), Cape Town, Advertising Agents for Cape Colony, Transvaal, Orange River Colony, Natal, and Great Britain. J. Kapnek, P.O. Box 91, Salisbury for Rhodesia.

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## ADVERTISEMENTS.

### Farmers' Advertisements.

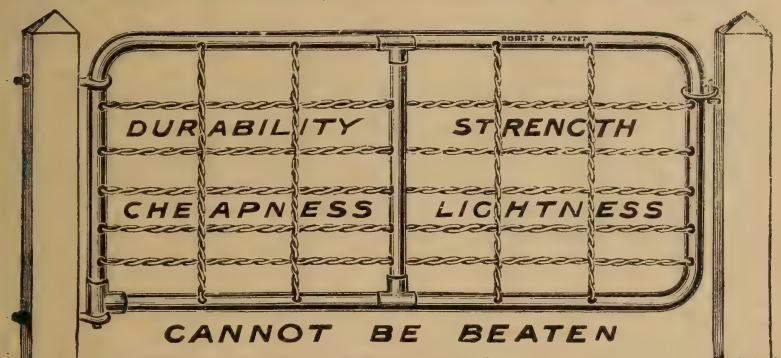
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|-------------------------|-----------------|----------------|---------------|-----------------|----------------|
| 1 1/2                   | 13 feet         | £3 5 0         | 2             | 15 feet         | £3 17 6        |
| 1 3/4                   | 14 "            | 3 7 6          | 2             | 16 "            | 4 0 0          |
| 1 1/2                   | 15 "            | 3 10 0         | 2             | 17 "            | 4 2 6          |
| 1 3/4                   | 16 "            | 3 12 6         | 2             | 18 "            | 4 5 0          |

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|---------------|-----------------|----------------|---------------|-----------------|----------------|
| 1 inch        | 2 to 4 feet     | £1 0 0         | 1 1/2 inches  | 7 feet          | £2 5 0         |
| 1 1/4 inches  | 2 to 4 feet     | 1 5 0          | 1 3/4 "       | 8 "             | 2 7 6          |
| 1 1/2 "       | 5 "             | 1 7 6          | 1 1/2 "       | 9 "             | 2 10 0         |
| 1 3/4 "       | 6 "             | 1 10 0         | 1 3/4 "       | 10 "            | 2 12 6         |
| 1 1/2 "       | 7 "             | 1 12 6         | 1 1/2 "       | 11 "            | 2 15 0         |
| 1 3/4 "       | 8 "             | 1 15 0         | 1 3/4 "       | 12 "            | 2 17 6         |

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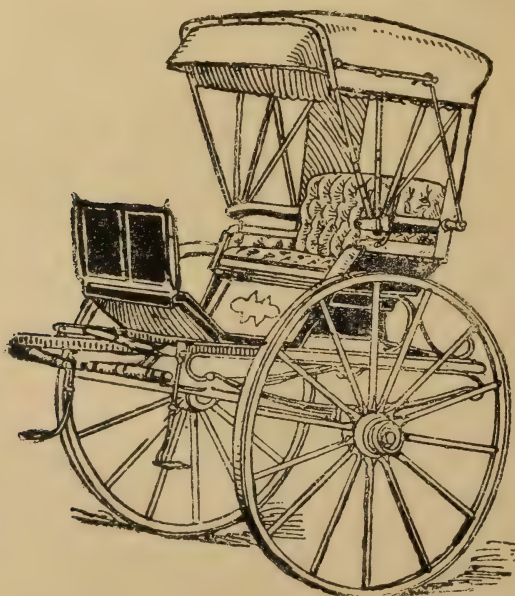
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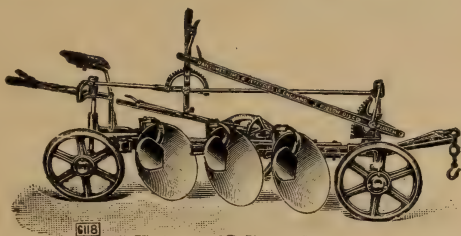
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**Agricultural Journal.**

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JUNE, 1907.

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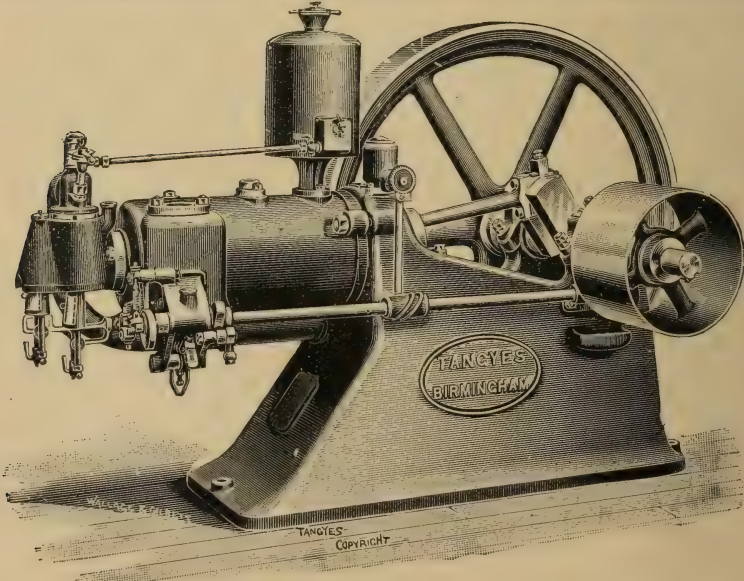
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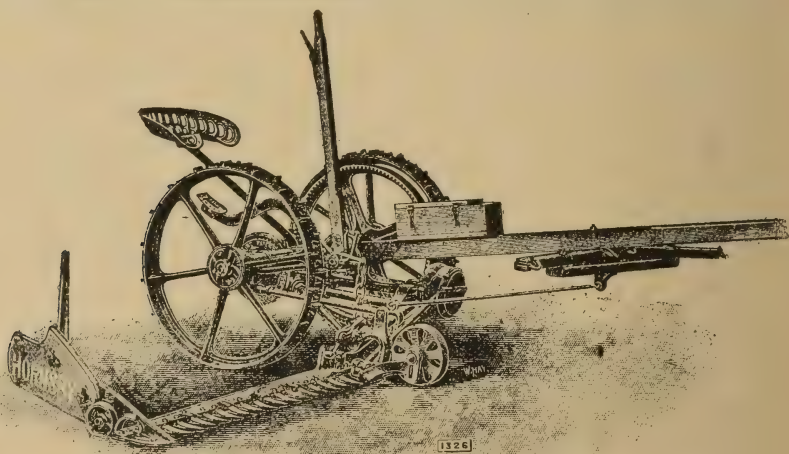
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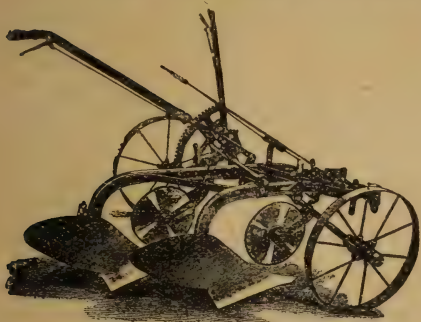
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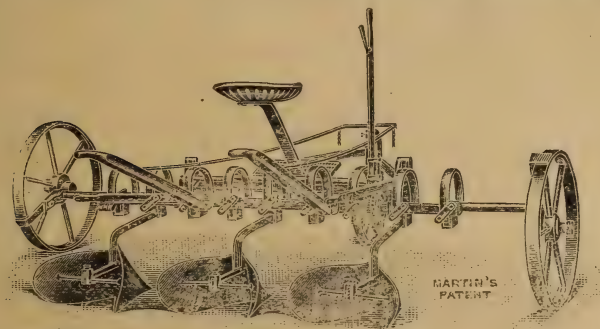


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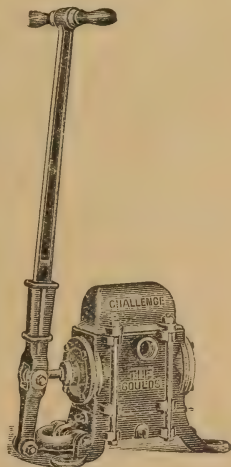
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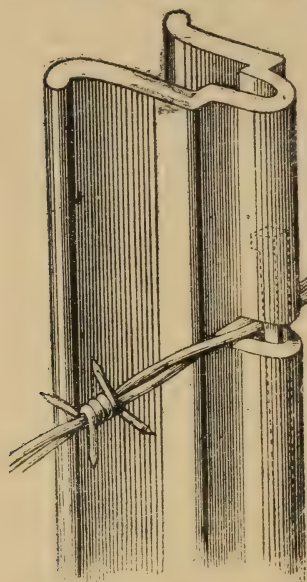


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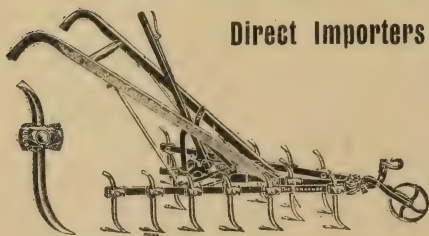
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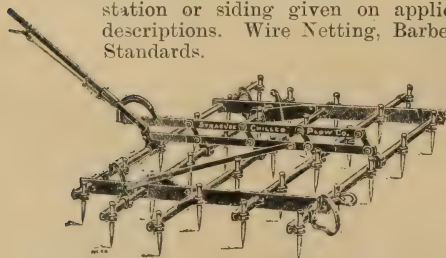
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# THE RHODESIAN AGRICULTURAL JOURNAL

Issued by the Agricultural Department.

EDITED BY L. A. KING-CHURCH.

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VOL. IV.—No. 5.]      JUNE, 1907.      [5s. per annum.

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## Editorial.

The Seventh Umtali Agricultural Show was held on Friday, May 17th.

The Show this year was disappointing, the competition being practically nil, owing to the few entries in all classes.

In several cases there was only one entry, but thanks to the excellent system of judging employed, viz., by points, no exhibit, even when the only representative of its class, was awarded a prize unless it showed sufficient merit, and scored sufficient points to deserve it. There can be no two opinions on the advantage of this system of judging: each exhibit, be it stock, produce, or poultry, receives individual attention, and there is no opportunity for a judge, having a fancy for a particular style, awarding a card to the animal or product which suits his taste, to the detriment of the other exhibits in the class, which may score more on other points, yet not be strong in the particular direction favoured by the judge. The system is also of assistance to exhibitors, who, knowing the value of the respective points, are able to make a better selection from their stock for showing.

All the arrangements for the Show were excellent, and the attendance was fair. The Produce Hall would have presented a large array of poorly filled tables, had it not been for the activity and energy shown by the townspeople, and more especially of the ladies of Umtali.

The classes coming under the head of Rhodesian and Mozambique Produce, which included all produce of a really agricultural nature, were poorly supported. The potato classes were best filled, and Mr. J. Meikle carried off most of the honours, his potatoes being well grown, a good shape, firm, and carefully selected and prepared for exhibition; in the Seed Potato Class, Mrs. Champken took the 1st prize with some good firm potatoes of a nice size for seed, and which had evidently been out of the ground for some time, yet showed every appearance of keeping well for some time longer. Perhaps the early date of the Show accounted for the poor exhibit of Mealies, certainly two of the exhibits, out of three, in the class for White Mealies, were too wet for storage, and were therefore not judged. The exhibits shown as Hickory King were not what they were represented to be.

The Tobacco exhibits were not numerous, or particularly good; this is to be wondered at, considering the great interest and undoubted future there is for the tobacco industry in this country.

There was a good bale of Paspalum Grass exhibited by Messrs. Meikle Bros. This is encouraging, as showing that at least one farmer has realised the value of this grass as a winter fodder for stock. Others may be growing it, but if so they did not trouble to exhibit it. Farmers intending to start, or already carrying on dairying, will do well to grow a good supply of this grass, which has proved invaluable to dairymen in New Zealand and parts of Australia, and which evidently flourishes well in the neighbourhood of Umtali.

In the Cattle Section the two best cows were entered under the Class for "Cow, any other breed," and were judged as dual purpose animals; they both obtained a large number of points on the score card, and the one scoring the highest was awarded the Gold Medal for the "Best Cow in the Show for General Purposes." The Friesland Cow shown alone in her class would have scored higher had she been in better condition.



The Sheep Section was distinctly disappointing, no woolled sheep being exhibited; this seems to indicate a lack of interest in the Show by sheep farmers, as quite recently Rhodesian wool, coming from the Umtali district, as will be seen in another part of the Journal, has been exported to England, and fetched good prices there.

The Goats shown were of better quality than the sheep; some of the goats scored high, but the judges seem to have been as liberal as possible in scoring.

In the Pig Section those few animals exhibited were on the whole good, but the numbers shown would not encourage the promoters of the Co-operative Pork and Bacon Factory. Next year it is to be hoped that a very different state of affairs will be evident, and a large number of this useful and prolific animal shown, which it is hoped is destined to convert low priced and surplus mealies into a valuable asset.

The Poultry Section was numerically the best on the show, and taken as a whole the quality of the birds shown was excellent. It was a pity the pens were not raised at least a foot higher, as it must have been distinctly back-breaking work judging, and the exhibits could not be thoroughly appreciated without stooping to examine them.

The best birds were a pen of Plymouth Rocks, belonging to Captain Cazalet, and of the water-fowl, a pen of Rouen Ducks belonging to Mr. Brooking. It is a difficult matter to judge birds in classes for "Egg Producing Variety," "Table Variety," and "General Purpose." For the first the laying competition is the only true criterion; for the second the birds should really be shown as dressed poultry, and points scored for age, weight, shape, colour of skin, legs, etc.; for the third, or general purpose class, the aim should be a breed in which the pullets rivalled the egg-producing varieties, and cockerels suitable for table purposes.

There was only one exhibit in the section for Dairy and Agricultural Implements, and this could not be called a representative one of the needs of the farm. Merchants do not seem to realise the valuable advertising advantages offered by a Show, where farmers collect together, and are able to compare, discuss, and criticise the numerous agricultural implements now available and almost essential for their work. Each grumble about scarcity of labour can be met now by an offer of labour-saving ma-

chinery, and farming has become such an exact science that it cannot be carried on successfully, except on the most up-to-date methods, and with the most efficient appliances.

Among the Special Exhibits were some of great interest, especially one of Sisal Hemp. This fibre-producing aloe thrives well in Umtali, and there seems to be a good opening for its cultivation. Hot, dry, and otherwise useless portions of the farm will produce the best fibre, and the demand on the London market is at present in excess of the supply.

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### **Sisal Hemp.**

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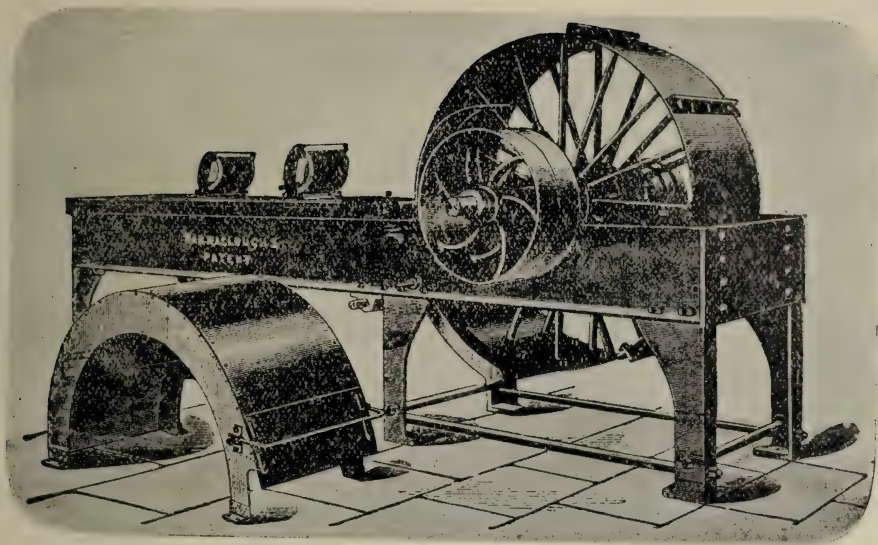
As some enquiries have recently been made with regard to the fibre industry, especially in connection with Sisal Hemp, the following short notes on the subject may be found useful.

Sisal Hemp is obtained from the *Agave rigida*, which is indigenous to Central America; this plant is also found to thrive well in most other tropical and sub-tropical countries. There are several varieties from which the fibre is extracted, the chief being *Agave elongata* and *Agave sisalana*.

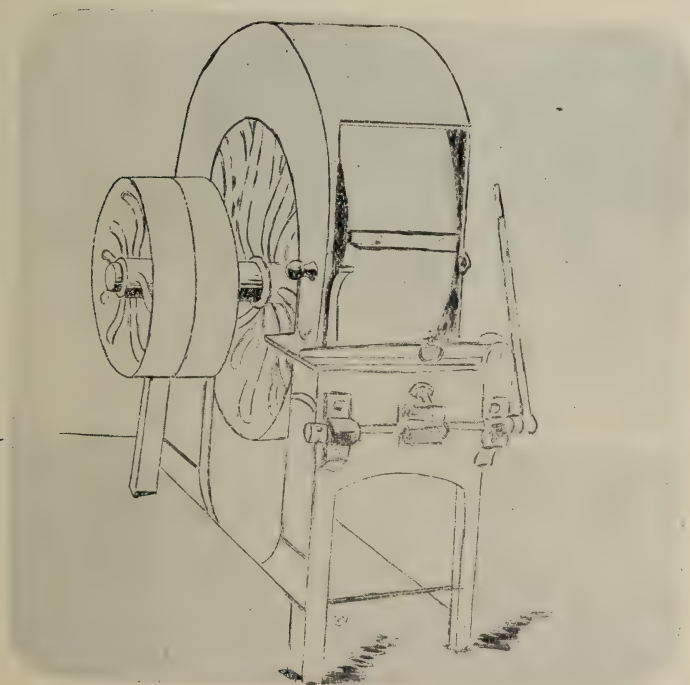
The *Agave elongata* is of a greyish green colour with thorny spikes on the edge of the leaves, and the *Agave sisalana* is of a dark green colour, having no spikes on the edge of the leaves, which facilitates handling. The name *sisalana* arose from the fact that large quantities of the fibre were imported from the port of Sisal, the principal port of Yucatan.

The *Agave rigida* flourishes best in poor, dry, rocky soils, and delights in hot dry weather. The only soil it will not grow in is absolutely barren sand and wet undrained land; it prefers a soil composed mainly of limestone. On thin poor soils the strength of the plant goes into the leaves instead of into the roots, which latter spread out close to the surface and produce numerous suckers. On well-cultivated rich lands the plants thrive best, but produce too large a proportion of pulp to fibre.

The plants are propagated from suckers, which spring from the roots or from "bulbils," which are produced in great numbers from the flower stalks in place of seed pods.



The Barraclough Fibre-Scutching Machine with Automatic Feed Table.



The Barraclough "Simplex" Fibre-Scutching Machine.





These mast plants, as they are also called, are taken from the stalk when ready, and planted in seed beds, and afterwards, when large enough, planted out on the land. Plants propagated in this manner do not come into profit as quickly as those grown from suckers, the latter produce leaves fit to cut at the end of three years, the bulbils plants take from four to five years before they are ready to cut. Much of the land on which Sisal Hemp is grown is not fit for cultivation owing to its rocky nature, so the plants are set in holes previously dug, and no cultivation is necessary beyond cutting down the grass and weeds twice a year to allow the young plants to get the full benefit of the rains that fall. Cattle should not be allowed to graze over the plantation, not that they will eat the plants, but they are liable to do damage by trampling on them, and if the plants do not grow upright it adds considerably to the trouble of harvesting.

When setting out a plantation of Sisal Hemp roads should be left between the rows at intervals to allow a wagon to pass to collect the leaves when cut, the plants should be set in rows eleven feet apart, and from six to seven feet apart in the rows; these distances should be varied according to the nature of the soil, in rich soil the greater distance should be allowed, on poor thin soils, rows eight feet apart and plants from six to seven feet apart in the rows will often be found sufficient.

The Agave will yield full returns in four or five years, but harvesting may be begun in three years after planting. The ripened lower leaves are cut off, and every four months the same operation may be repeated. When the leaves are ready for cutting they incline downwards to a horizontal position, and become darker in colour. Care must be taken to cut the leaves from the bottom upwards, and to cut close to the stem. If the *Agave rigida* elongata, the variety having spines on the edge of the leaf, is being harvested, the spines must be trimmed off each leaf to facilitate handling. The leaves are usually tied in bundles of twenty-five or fifty, point to butt alternately, and carried to the headland when the wagons draw them up. One man can cut and tie up twelve hundred leaves per day on an average. The knife used for cutting is an ordinary sheath knife with an eight-inch blade.

The life of the Agave plant is a comparatively long one, but this long life may be shortened by careless or

injudicious management. If the plant is allowed to send up a pole, it is ruined for fibre production. The pole on which the flowers and seeds are borne will run to a height of thirty or forty feet. Regular cutting of the leaves retards the production of the flower pole, and will prolong the life of the plant to fifteen years and more. About every two years numerous shoots spring from the roots, and these may be either used to form fresh plantations or may be destroyed. When the Agave has completed its fifteenth year, it may be cut down, but one of its roots must be left to take its place. Thus the original area planted will never require to be replanted, whilst large numbers of young plants are produced to form new plantations.

For the extraction of fibre, machines called "Raspadors" are universally used in all countries where Agave fibre is produced. These machines are not expensive, and will turn out 333 lbs. of clean fibre in ten hours. In Mauritius a machine called the "Gratte" is used. Both the names of the machines signify rasps or scratchers. The Raspador consists of a large-toothed wheel which scrapes the pulp away and leaves the fibre. The average work of a Raspador is about 7,000 leaves per day with two men continually engaged in feeding it. The machine is simply a wheel, four feet in diameter and six inches broad. At every foot in the face of the wheel are brass or gun-metal bars, one inch square and six inches long, fixed firmly across the face. The wheel works in a case, to prevent the workmen being splashed by the acrid juice, which causes a painful burning sensation. The wheel revolves at about two hundred revolutions per minute. The leaf is pushed through a small opening at one end of the casing, and is held firmly by a clamp or even by the hand. A kind of break worked by the foot, works a heavy block against the leaf, thus pressing it against the wheel. In a few seconds the pulp is beaten out by the bars on the wheel. Then the leaf is reversed and the other half treated in the same manner. Such primitive machines are used by hundreds in Mexico and Mauritius, but for those who require something better there have been invented more elaborate and expensive machines, amongst which the best are said to be those invented by Mr. T. C. Todd, of Patterson, New Jersey, U.S.A., and the Barraclough, invented and manufactured by Mr. Thos. Barraclough, of Bucklersbury, London.



The Todd machine is automatic, the leaves are only handled once, and are cleaned by two drums or scutching wheels working on alternate sides. They are fed at one end and the clean fibre is delivered at the other. Only one boy is needed to arrange the leaves on the feed table. They enter the machine sideways instead of endways, as in the Raspador. It is claimed that forty to sixty leaves can be cleaned in one minute, and that 1,500 lbs. of fibre can be turned out by it in a day. The power used to drive the machine is either a steam or oil engine. The Barraclough machine is cheaper, but very effective.

After the fibre has been extracted it has to be dried and bleached, and then pressed and baled. Bales are generally made to weigh from 350 to 400 lbs. The cubic measurement is from 20 to 22 feet, according to the size and weight of each bale, from four to six bands of rope or galvanised iron wire are put on. The fibre should be compressed to the uttermost to save shipping charges, which are not calculated by weight, but on the cubic space taken up by the bale.

For the information and illustrations contained in the above article I am indebted to an article on "The Cultivation of Sisal," in the Queensland Agricultural Journal.

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## Soils in relation to Fertility.

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By I. CAMERON.

The point to be investigated here is the formation, the construction, and constitution of soils in Rhodesia that are found to be fertile.

Our attention will be directed mainly to an examination of the actual character and composition of those types of soil that are found to respond best to cultivation.

No distinction need here be made as to adaptability for special crops; the special characters required in accommodating the peculiarities of certain crops are determined on other grounds than that of mere fertility.

But the principles on which soils are constituted adapting them to carry on the growth of plants are the same throughout. It is only the modifications in the way that the materials occur, that in most cases makes the differ-

ence between fertility and infertility, including in a great measure special fitness for certain crops.

While the chemical constituents essential to fertility may be inherently present in abundance, and also that the upper nine or ten inches of soil is under the control of the cultivator, yet even this combination may fail in producing satisfactory results when other factors not under the direct influence of cultivation are in active and adverse operation.

The relative construction and size of the particles forming a fertile soil in Rhodesia are not altogether identical with materials in a similar relation forming a fertile soil in many other countries.

Thus many of our vleis soils are abundantly supplied with all requirements of growth, and are also naturally well supplied with moisture. In moderately humid conditions these soils yield magnificently, yet the practical obstacles to their profitable cultivation in this climate lie in their being so readily hardened in dry and hot weather that they are only worked with the greatest difficulty; while in wet weather again they are equally soon unworkable.

It is a feature of the Rhodesian climate that even in the same season it may be alternately intensely humid, and intensely arid in its bearing on the soil. Hence a type of soil that in a greater degree can withstand both extremes holds out better prospects of yielding good crops than a soil that is merely rich in its constituents.

It thus happens that the limit of closeness of texture in relation to purposes of cultivation is much sooner approached here than in more pronounced humid climates.

It may be admitted that the potential value of such soils is not here being considered, inasmuch as it is soil that has inherently the most suitable qualities that naturally is entitled to receive first attention. It is besides more feasible in present circumstances to artificially promote the fertility of certain light soils than it is to remove the obstacles associated with heavy vleis soils.

But with regard to light soils on the other hand, a limit is reached where porosity and open texture cease to be a virtue, and herein as distinct from clay soils, a degree of coarseness of texture is soon reached beyond which they too are impracticable.

Apart from irrigation and drainage for the improvement of adverse natural conditions, the practical issue

farmers have to deal with, and which lies nearest them, is to make the most of the particular soils that have a medium texture, inclining more to lightness than heaviness perhaps for most purposes.

The examination of a section of any soil to the depth of three or four feet, showing the way of deposition, and the mechanical separation of the component grains into the different grades of size, the character is thus to a large extent distinctly manifested. The reasons are brought out why a soil may be too heavy or too light, or whether it possesses the qualities suiting it for purposes of cultivation.

On nearly all farms the different types exist, but only comparatively small areas possess a high degree of inherent fertility, and are at the same time sufficiently adapted to the climatic conditions.

Thus a mechanical analysis of any particular soil will afford the data suggesting what method of tillage to pursue; whether in the case of a soil inclining too much to sand, measures would be taken with the view of increasing its holding power, and in the case of a soil inclining to clay, the management should be directed towards keeping it open.

It is true that the rock formation on which a soil rests, or from which it has been derived, has in many ways great influence on its character, yet large areas of land suitable for purposes of cultivation are to be found on all formations.

Provided the physical texture of a soil to the depth of three or four feet is of such a nature that it beneficially controls its own water supply, then the other elements of fertility, although essential, are at the same time subordinate.

It is well also to take into account that no soil is altogether and wholly derived from the formation on which it rests or which immediately surrounds it. There is every reason to believe that wind has performed a considerable part in carrying soil matter in the form of dust from one part of the country to another, thus providing a mixture which may be of great importance towards fertility.

A feature belonging to the upper strata in many parts of this country may be observed, wherein a layer of gravel or shingle is found having a varying thickness and lying horizontally with the surface.



The thickness may be a few inches, or a few feet, and in some places the gravel approaches, or is on the surface, while more often it runs in a plane below, at a depth perhaps a foot or two or several feet.

As this country is held to be an unglaciated area, and considering that the rock fragments are angular, showing no trace of having been deposited by water, it does not appear quite clear what agency had been at work in this process of sifting out.

If the view were taken that this gravel or shingle bed had been the land surface at some former period, then under desert conditions it is possible that wind may have blown the sand away, leaving the heavier pebbles *in situ*.

But whatever may have been the origin of these gravel bars, it happens that they have a very deleterious effect upon soils when lying within a foot or two from the surface.

There is such a thing as a soil having too much air, as well as a soil having too much water.

When coarse sand or gravel occurs in quantity in the subsoil, air currents or draughts are set in motion within the soil, thus unduly hastening evaporation, with the consequence of drying up the moisture far too quickly from the roots of plants.

There is besides another adverse feature attached to subsoils that are too coarse, and that is the encouragement given to excessive leaching. A soil may have a good surface, and be well manured and cultivated, and have a crop looking promising in the early part of the season; with heat and sufficient moisture there rapidly forms soluble materials which principally attach to the finer material of clay, but when an extra heavy rain comes on, perhaps two or three inches in the twenty-four hours, then not only the soluble nitrates are washed out, but also much of the finer soil matter is carried down in suspension and beyond the reach of plants.

All sandy soils are subject to being affected in some degree after this manner, but much may be done in counteracting this tendency, by augmenting in every way possible the amount of humus or organic matter in the tilled surface. Mechanical pressure, harrowing and rolling are beneficial for soils of this description. It is no doubt common to soils in this country that after being

well tilled and cultivated, and the crops growing, it occurs that during the course of a short spell of hot dry weather after heavy rain, the ground gets baked hard, even although it is sandy.

This is chiefly due to the effects of too sudden drying. If it were possible, which it often is, to lightly harrow the surface immediately it was dry enough to be walked upon without sinking, then this mulch produced would sufficiently modify the evaporation so as to allow the land to dry gradually, when no baking would take place.

While leaching may be a disadvantage in many respects, yet it must not be overlooked that to this agency may be due the peculiar fitness of so many of the soils of this country for growing tobacco. It is only in cases where leaching is excessive that soils are unprofitable for this crop, and this not because of the quality produced, but on account of the smallness of crop.

It seems the first essential of a good tobacco soil that it be sufficiently porous in the subsoil allowing water to pass through it with certain freedom.

It is, moreover, becoming evident that good tobacco soils are not altogether confined to particular geological formations, neither to certain districts, but they occur throughout wherever the texture of a soil is sufficiently open; yet not so open as to border on sterility, nor so close as to retain all soil ingredients coming into solution.

Calcareous soils are eminently adapted for stock raising, and for most crops, yet their very good qualities in this respect are unfavourable to tobacco.

Apart from calcareous soils, however, it is a marked feature in all open textured soils that they show a great deficiency of lime in the form of carbonate. There is little doubt but the loss of lime that these soils have sustained is due to leaching, and while other substances are thus got rid of beneficially, yet this want of lime restricts fertility, besides encouraging fungoid and other plant diseases.

When the absence of lime is marked, it is of the highest importance that it be supplied, and even in the case of light sandy soils an application of lime along with organic matter in any form will greatly promote its productive powers, and without having any injurious effect whatever.

But since lime is a somewhat expensive commodity to procure, the next best thing to do with a light soil is to

supply it with a goodly amount of organic matter. Farmyard, or kraal manure not being abundant, the alternative for this is the abundance of veldt grasses on the vleis.

These veldt grasses constitute a very good manure, especially if they are cut green, and there is no necessity to do otherwise than spread this grass on the land, and without putting it through the process of making it into dung.

The soil itself will very soon break it up, forming it into humus, and this substance is the chief agent in improving the texture of light soils, besides contributing to the supply of plant food within the soil; this is really all that farmyard manure does.

It may be noted that it is better in the case of light soils that such applications, whether dung or veldt grasses, should be left near the surface rather than be ploughed deeply under. There are several observed reasons for this, but the chief point is that being near the surface, decomposition takes place only gradually, and is more extended over the growing period of the crop. When deposited well into the soil, the heat and moisture produce so rapid fermentation that much of the good effects are lost before plants can take advantage of them. Excessive heat within the soil is likewise encouraged, whereas being near the top or near the surface, this manure acts as a mulch tending to keep the land cool, thus retarding evaporation.

Mostly all the light soils also manifest a stinted supply of phosphates, and in many cases of potash, but in the absence of lime, even the application of these manures artificially in a concentrated form is not always followed with satisfactory results, especially so in the forms of superphosphate or kainit.

The soil being already deficient in basic ingredients, the introduction of acid manures only tends to further depletion, and without adding much to the available quantities of these materials in the soil.

Bone ash or basic slag are suitable forms in which to supply phosphoric acid, only it is not quite clear that when a soil shows a low productive power, the cause of which is to be attributed to the want of either it or potash.

It is the even distribution of relatively small-sized particles throughout a considerable depth that constitutes



conditions best adapted for meeting vicissitudes of climate together with fertility. Even in the case of gravel subsoils, where there is a considerable amount of fine silt and clay adhering to and surrounding the pebbles, such a soil may be quite fertile, providing the rains are frequent and ample, but they are unable to resist drought because the amount of water they are able to hold when fully saturated is very much less than what is held by subsoils composed only of small sized grains.

While soils inclining towards a sandy nature offer certain facilities for cultivation, in classifying soils no distinct line can be drawn limiting the amount of clay that beneficially may be present. Herein much depends on the condition in which the clay particles exist, whether in a state of separation or aggregation.

This property of flocculation or aggregation prevails throughout a large class of soils, and though due to chemical causes, yet the effects are largely of a mechanical nature.

The presence of lime has a marked influence in promoting the coagulation of clay particles into aggregates and thus opening up the texture. Through this, many soils are brought into cultivation, but the total amount of clay they actually contain, if in a free state, would render them unworkable.

But a large class of soils owe this property of aggregation to oxide of iron. The greater part of the red soils are composed of matter so finely disintegrated that they would be termed clay, but this property of aggregation modifies the texture to such a degree that they are practically free working soils, while at the same time they retain most of the fertile qualities pertaining to clay.

This aggregation of the particles takes place throughout the mass, and to a considerable depth. The grains thus formed are held together with remarkable adhesive force, so much so in fact that they differ very little physically from grains of sand.

When these soil grains are softly rubbed up with water, their character is revealed, and it is found that a certain quantity of free iron is left in a very fine state of division, after all the lighter material—the silt and clay—is washed out.

It would seem as if iron oxide contributes to the aggregation of the finer soil matter while undergoing a process of reduction, and it is probable that organic matter plays

an important part in the reactions thus taking place in the soil.

But a very great deal depends on the manner in which these soils are cultivated. Ploughing, or working them in any way while in a wet state, destroys flocculation just as happens when working them up in separation with water. A mere soaking, such as under heavy rain, affects them very little; it is the rubbing them on each other, as in ploughing or harrowing that breaks up the aggregates.

For these and for many other reasons, great advantage would be gained in ploughing and harrowing these soils immediately on the crop being removed. At that time there will nearly always be just sufficient moisture allowing ploughing to be done, and when thus turned over and well harrowed simultaneously with the harvest, then the soil would be left over the dry season in the most favourable condition for conserving moisture.

Besides, it would be in a condition securing every facility for being made ready for the next crop without having to be worked, except when its state of dryness was at its best.

Particular value attaches to this class of soil from the fact that it is suited for a great variety of crops, and at the same time gives a better yield than soil wherein the sand is composed of quartz.

It is highly probable that many of these altered clay soils will prove highly adapted for tobacco-growing, since their fertility seems to be well sustained without being highly charged with lime.

### MECHANICAL ANALYSIS OF SOILS.

The principle of mechanical analysis consists in separating the samples, first into the relative amounts of the different grades with sieves, and then further apportionment, by measurement, of the time the different sizes—the clay and silt—remain suspended in water.

Clay is the finer matter that remains in suspension up to twenty-four hours. Different times are allotted for very fine sand and silt—from one minute to twenty-five minutes.

The considerations that attach to this method of estimating a soil rest on the fact that drought resisting qualities, that is fertility, or capability to retain moisture, depend largely on the relative amount of the finer material—the clay and silt—present.

Moreover, it is ascertained that more than half of the total plant food present in an easily available condition, is held by, and associated with, the clay and humus. Hence the capability of any soil for crop growing—its fertility, is governed to the greatest extent by the amount of silt and clay present, coupled with even distribution.

The following table is given showing the different grades of size in the composition of samples of soil from a farm on the Hunyani.

| Mechanical Analysis.   | Soils from Hunyani. |       |       |       |
|--|---------------------|-------|-------|-------|
|  | A.                  | B.    | C.    | D.    |
| Surface 9 inches :   | %                   | %     | %     | %     |
| Coarse sand and gravel not passing 30 mesh... ..                 | 21·75               | 24·25 | 11·27 | 17·50 |
| Passing 30 but not 60 mesh                                       | 30·50               | 25·75 | 27·20 | 23·50 |
| "    60    "    90    "  | 22·75               | 21·50 | 27·25 | 20·25 |
| "    90 mesh ... ..  | 25·00               | 28·50 | 34·28 | 38·75 |
| The fine earth passing 90, on being further separated, yielded : |                     |       |       |       |
| Fine sand ... ..   | 85·50               | 82·00 | 78·00 | 68·00 |
| Silt ... ..  | 4·00                | 5·50  | 8·20  | 10·70 |
| Fine Silt ... ..   | 1·00                | 6·25  | 2·50  | 2·30  |
| Clay ... ..  | 9·20                | 6·30  | 9·48  | 18·65 |
| Loss on ignition — Organic matter, etc. ... ..                   | 4·                  | 3·2   | 4·5   | 7·0   |
| Lime as Carbonate ... ..   | trace               | trace | trace | 0·3   |
| Subsoils, 9 to 24 inches :                                       |                     |       |       |       |
| Coarse sand and gravel not passing 30 mesh... ..                 | 38·25               | 26·50 | 22·52 | 23·43 |
| Passing 30 but not 60 mesh                                       | 26·75               | 27·50 | 31·25 | 24·50 |
| "    60    "    90    "  | 17·00               | 20·75 | 22·00 | 22·32 |
| "    90 mesh ... ..  | 18·00               | 25·25 | 23·53 | 29·75 |
| Subsoils, 24 to 36 inches :                                      |                     |       |       |       |
| Coarse sand and gravel not passing 30 mesh... ..                 | 34·50               | 76·75 | 81·50 | 28·00 |
| Passing 30 but not 60 mesh                                       | 30·50               | 14·50 | 4·00  | 26·75 |
| "    60    "    90    "  | 16·20               | 4·50  | 4·00  | 16·00 |
| "    90 mesh ... ..  | 17·50               | 4·00  | 4·00  | 26·75 |



The samples A, B, C and D are from different fields. A is yielding a very good crop of tobacco, while B is a partial failure. Both are sandy soils lying directly over granite. C is yielding a somewhat indifferent crop of mealies, and has only recently been brought under cultivation. D is partly under mealies and partly under tobacco, and both crops are good. C is on granite bordering on a formation of ironstone, while D is more on the ironstone formation.

The amounts of the different grades yielded by each are given in percentages.

It will be seen that A gives a fairly well proportioned quantity throughout, and this is continued right down to the distance of three feet. While the type is a very pronounced sand, yet this even distribution, together with a fair proportion of the finer grades, affords some clue to its fertility.

B is a field in the near proximity of A, and has very similar composition until the third foot is reached, when coarse quartz pebbles almost wholly compose this part of the subsoil. Any soil with such a bottom must always be "catchy" in its yielding powers. Excess of rain or severe drought equally prove against it.

C suffers from the same cause, only in this case nodules of iron oxides take the place of quartz.

D has an even texture throughout, and shows a marked superiority over the others in the amount of the finer material. Indeed, many of the grains failing to pass the sieves are not really sand, but aggregates having the character of sand. It is only when rubbed up with water that so much clay is revealed.

The outstanding feature observable in A, B, and C is the very large percentage of "fine sand." This amount 85.50, 82.00, and 78.00 in A, B and C respectively, at once reveals their character, showing why they are loose in the texture, and why they do not possess high faculties in retaining moisture or fertilising matter.

The chemical analysis shows the more important soil ingredients in the foregoing samples as follows:—

| Chemical Analysis.          | Soils from Hunyani. |       |       |       |
|-----------------------------|---------------------|-------|-------|-------|
|                             | A.                  | B.    | C.    | D.    |
| Surface 9 inches :          |                     |       |       |       |
| Insoluble residue ... ..    | 93·75               | 93·00 | 87·00 | 77·00 |
| Lime ... ..                 | 0·05                | trace | 0·07  | 0·12  |
| Oxide of iron ... ..        | 3·00                | 2·35  | 3·90  | 9·25  |
| Alumina ... ..              | 1·35                | 1·28  | 2·25  | 3·20  |
| Phosphoric acid ... ..      | 0·03                | 0·02  | 0·06  | 0·13  |
| Potash ... ..               | 0·17                | 0·08  | 0·13  | 0·24  |
| Hygroscopic moisture ... .. | 0·83                | 0·50  | 0·90  | 1·10  |
| Organic matter ... ..       | 3·80                | 2·90  | 3·68  | 5·75  |
| Nitrogen ... ..             | 0·17                | 0·13  | 0·16  | 0·27  |

There is nothing showing any well marked difference between A, B and C. They are all poor in organic matter and in lime.

Phosphoric acid is low in the case of A and B, and potash is present only in very small quantity. Not much stress can be laid on the deficiency of nitrogen present, since the season of the year, and the bearing of a crop, influence the amount. But there is a great want of organic matter forming the fund from which nitrogen is derived.

The application of a small dose of lime, together with a supply of organic matter, would have the effect of rectifying these soils as regards potash, along with the other aids given towards fertility.

D appears fairly supplied with all the essentials, but care should be taken to keep up the amount of organic matter for the sake of its mechanical, as well as its chemical effects. On this being done, D is equipped for maintaining a high standard of fertility indefinitely, and is admirably suited for almost any kind of crop, including tobacco.

*Rock Specimens.*—In some parts of this Hunyani district there are small nodules of a white colour found in more or less profusion in certain spots. The shape of these pebbles is irregular, and the size ranges around an inch in diameter.

On examination, these nodules are found to contain 88 per cent. of Carbonate of Lime and 3 to 5 per cent. Phosphoric Acid.

They appear to be associated in some way with ant heaps. Where some of these ant mounds have been cut through in forming the railway line, a considerable deposit of these nodules is exposed in a heap near the bottom. The same kind of specimens are to be met with throughout widely separated parts of Rhodesia, and are distinct from the ordinary lime deposits that exist in various localities.

These peculiar deposits are worth paying some attention to in order to discover whether they exist anywhere in sufficient quantity warranting the expense of collecting and grinding them.

Their value as a fertilizer when ground sufficiently fine would be from £5 to £8 per ton.

The discovery of minerals in this country has hitherto been directed in finding the precious metals and ores for export; but there is a wide field of research still open for the discovery of minerals having an agricultural value for use within Rhodesia.

Lime we know is abundant in several well known localities, but in order to be of practical value to farmers it must be comparatively near the spot where it is to be used. But rocks rich in phosphate of lime such as Apatite or Coprolites, are minerals that will bear the cost of transit a considerable distance.

It is highly probable that such rocks do exist in the country, and specimens which are regarded as containing Phosphate of lime, Carbonate of lime, or Sulphate of lime, on being sent by farmers to the Agricultural Laboratory will receive due attention.

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## Feeding Whole Grain.

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The following observations carried out at the Michigan State Agricultural College, were undertaken as a result of having noticed that a fairly good stand of mealies and oats grew on land manured with droppings from cows fed on whole grain. The experiments were conducted with



the object of ascertaining what proportion of whole grain was not masticated and passed through the system undigested.

The tests were conducted with six Grade Dairy Cows, six pure bred Dairy yearling heifers, and six Holstein Grade calves about six months old. The experiments all lasted for seven days of twenty-four hours each, and during the time they were being carried on the animals were kept constantly in the stable and watered twice a day. All the grain fed was weighed and the droppings collected and washed through screens to separate the grain.

Three different rations were used, one of whole mealies, one of whole oats; and one of four parts of whole mealies, four parts of whole oats, and two parts of bran. Every animal of the eighteen under experiment received each of the grain rations during the test. The cows were fed 11 lbs. per head daily,  $5\frac{1}{2}$  lbs. morning and evening, in addition each cow received as much clover hay as she would eat up clean; during all the tests the cows receive the same amount, viz., 77 lbs. per head per week. The heifers were fed in the same way, receiving 6 lbs. per head daily, or 42 lbs. per week.

The calves were started on a ration of 3 lbs. per day, or 21 lbs. per week, but some trouble was found in keeping them up to this amount of feed, so during the last two periods 2 lbs. per day, or 14 lbs. per week was the allowance.

The following are the results of the experiments:—

Whole mealies not masticated:

|               | Per Cent. |
|---------------|-----------|
| Cows .....    | 22.75     |
| Heifers ..... | 10.77     |
| Calves .....  | 6.28      |

Whole Oats not masticated:

|               |       |
|---------------|-------|
| Cows .....    | 12.06 |
| Heifers ..... | 5.48  |
| Calves .....  | 2.98  |

Whole Corn and Oats not masticated:

|               |       |
|---------------|-------|
| Cows .....    | 26.46 |
| Heifers ..... | 17.50 |
| Calves .....  | 5.78  |

In order to determine whether any nutriment had been taken from the grain during the passage through the digestive tract, chemical analysis was made both of the grain as fed, and of samples of the grain washed from the droppings. In each case the greatest amount of ash was taken out by the cows, and the least by the calves, but with the Nitrogen free extract the reverse is true—the calves taking out more than the cows. From the results obtained, however, it may be said that practically no nutriment is taken from the grain which passes through the system without mastication, as the chemical analysis showed no appreciable change in the composition.

A germination test was made for the purpose of finding the effect upon the vitality of the seeds after passing through the digestive tract. The germination was tried in pans of sand, with one hundred seeds to the pan, kept well moistened and in a warm room. The average of several tests are given, five hundred seeds of each kind being tested.

Per Cent.

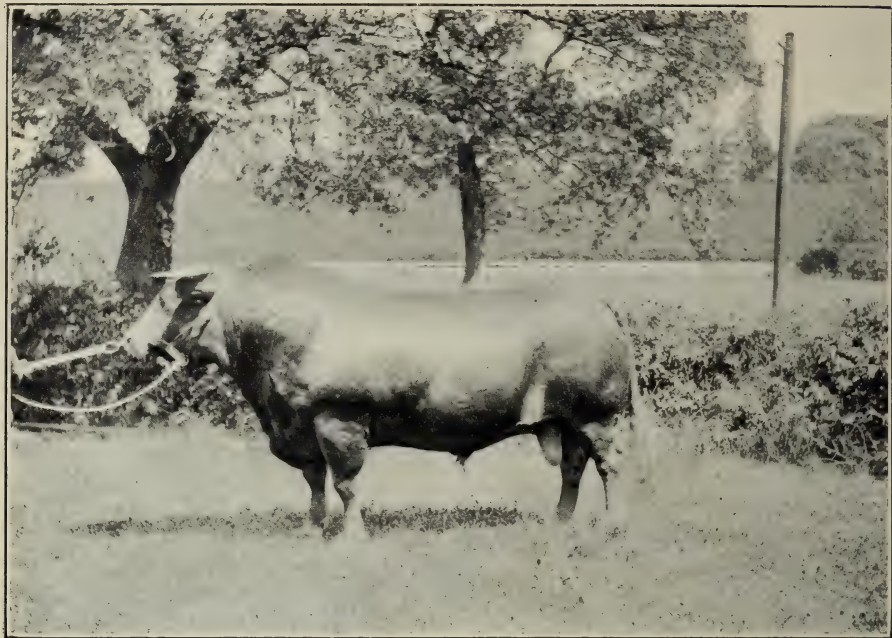
|                            |      |             |
|----------------------------|------|-------------|
| Mealies as fed .....       | 84   | germinated. |
| Mealies from droppings ... | 4·3  | germinated. |
| Oats as fed ... ..         | 99·6 | germinated. |
| Oats from droppings ... .. | 10·6 | germinated. |

The germinating power of the grain passing through the system was affected very markedly, but not entirely destroyed, and a field manured with these droppings produced a fairly good stand of oats.

From these observations it can be seen that it is a very wasteful process to feed dairy cows with whole grain. The amount of the grain ration may be quite correct for obtaining the best results from the cows, yet if it is not prepared in the most suitable way to enable them to get the greatest good from it, the results are likely to prove disappointing, and the margin between profit and loss to be seriously diminished. With an old cow who has proved a profitable animal in her prime, the loss through feeding whole grain would probably be much greater, yet with a properly prepared grain ration she could very possibly be made to pay for her keep for another year or two, and give a profit besides. Here the usefulness of farm statistics can be demonstrated, in determining







South Devon Bull, under 18 months old, sold for 33 guineas.



South Devon Cows for Sale.

whether it is more economical to feed whole grain in sufficient quantities to make up the loss of about 22 per cent., or pay the extra cost of grinding the smaller ration, and making all the digestible ingredients available for assimilation.

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## **South Devon or South Hampshire Cattle.**

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By F. W. YATES.

In continuation of the descriptive series of the various breeds of cattle, which you commenced in the last number, I must first draw the attention of my readers to the fact that these are an entirely different breed from the "Devons." These are found along the whole of South Devon, Dorset and Cornwall, and in fact are gradually encroaching on the homestead of the "Devons." They are eagerly sought after by the large feeders of Nottinghamshire, Sussex and Hampshire, who regularly attend the chief fairs in the spring and purchase large numbers of grazers. As they get fit for the butcher quicker than any others, the popularity of this breed is continually extending, and the pedigree cattle are in increasing demand, not only in the West. The export demand has made rapid growth, and several consignments during the past years have been sent to New Zealand and South Africa, also the Argentine are beginning to recognise their qualities. The South Devons are excellent grazers, produce the most and best beef in the shortest time, whilst their dairying qualities are such that they stand unequalled for the quality of milk, butter and cream which they yield. This is no empty boast, as later on facts will prove this statement. They have been put to the test over and over again, and have not only held their own in open competition, but proved their superiority as rent-payers, whether as dairy cattle or butcher beasts, and at no time have they stood higher in the estimation of good judges than at present. The cows have been brought into prominence by their successes at the London Dairy Show, also at Tring and other places. The triumph of the South Devons over the more fashionable breeds, which are clothed and coddled to produce milk and beef, whereas the South Devons are left out in the open and

then come out on top. Last year at Tring out of a class of sixty-nine in the open competition a South Devon was first in the milk and butter tests against all the petted animals of Lords and Dukes to whom the cost of rearing is no object. Take the record last year of the South Devon cow "Primula" 2nd (3937) belonging to Mr. Vosper.

1st milk test, 2nd butter test, at the Bath and West of England Show. Against all breeds.

1st milk test at Tring. Against all breeds.

1st milk test at the Royal Agricultural Show. Against all breeds.

1st Dairy Show at Islington.

The triumphs of the South Devons over the more fashionable breeds have been remarkable, and the only matter of regret is that so few of them have been sent to the Shows, which are grand advertising arenas.

At the Christmas Fat Stock Show at Smithfield, a South Devon was sent with the following result:—Age 23 months 26 days; live weight 15 cwt. 1 qr. 5 lbs.; average daily gain of live weight 2'37 lbs. per day; weight of dressed carcass 1,144 lbs.; percentage of carcass to gross live weight 66'78; weight of hide 102 lbs., and of loose fat 64 lbs. The nearest approach to him in the Show in daily gain of live weight was an Aberdeen Angus Steer, which produced 2'19 lbs. Its hindquarters weighed 64 lbs. more than the forequarters. At the block test at the same Show a South Devon heifer, "Snowdrop," which was exhibited in a class for heifers not over three years old, and amongst a dozen competitors, her live weight of 16 cwt. 0 qrs. 23 lbs. was more than 25 per cent. heavier than any of the rest. Placed first when alive, she was highly commended in the carcass class (the first in the class being only half the weight), her carcass scaled 1,179 lbs., a percentage of live weight of 64'95. The purchaser, Mr. Ginger, one of the largest West End butchers of London, made the following report:—"That she carried the most flesh in her back he ever saw, and was most satisfactory, without an ounce of waste, full of good quality, lean and of delicious flavour, and the best beef he ever put a knife into in his life."

With such testimony, following the high position they have attained at the Fat Stock Shows in the West, there



are reasons for claiming that the South Devons are really profitable butchers' beasts. It may be argued that those sent to Smithfield are exceptional beasts, but undoubtedly there were much better shown at the local Christmas fat stock shows in the West, whose owners could not afford the time and expense of taking them to London; for instance, at Plymouth there was a two-year-old Steer weighing over 18 cwt. At Totnes there was a much heavier beast shown, and turned the scale at 18 cwt. 2 qrs., and again at Exeter there was a three-year-old heifer, whose carcass weighed 1,132 lbs., all of which gave equal satisfaction to the butcher.

In Natal, several consignments have been sent and appreciated, and Mr. Gradwell's success at Bloemfontein with "Rent Taker" and her three daughters must have brought them into prominence in the Orange River Colony. Several consignments have been sent to Pretoria, which are found to acclimatise rapidly. Their huge frames and massive hindquarters, combined with their good temper, would make the breed appreciated as excellent transport cattle.

In the "Field" a few months back, there was a very able article on the various breeds, and the writer described the South Devons thus:—"A breed which has only come into prominence of late years from a public point of view. It is the largest breed we possess. In a country, too, where the butcher is not afraid of a big joint, they meet a ready market, and at the Smithfield Show the carcass class demonstrated their ability to come fit for the butcher with credit. The future of the breed lies with the tenant farmer, and wherever that is the case, depend upon it, the commercial qualities are well developed."

In conclusion, I might state that it is high time for the Government to go to the expense of importing some pedigree bulls of each of the most prominent breeds and assist the farmer in finding out which breed would answer the best, and not go to the Cape and purchase animals which are not entered in the Stud Book and which will never develop into a decent beast; for these are only stunted calves at the best, and which compare most unfavourably with those imported by private individuals.

Now the Government have their first surplus, they should apportion a small sum for the benefit of stock

owners by assisting them in getting the best animals, the same as is done in every other cattle country, and not expect to make a profit as in the past.

The photos are specimens of the breed sold at Totnes on April 5th, 1907, under the control of the South Devon Herd Book Society. The cow in the front fetched 40 guineas, and the bull was sold for 33 guineas in the class for bulls between 12 and 18 months old. The average for the 48 entered in that class was 26 guineas.

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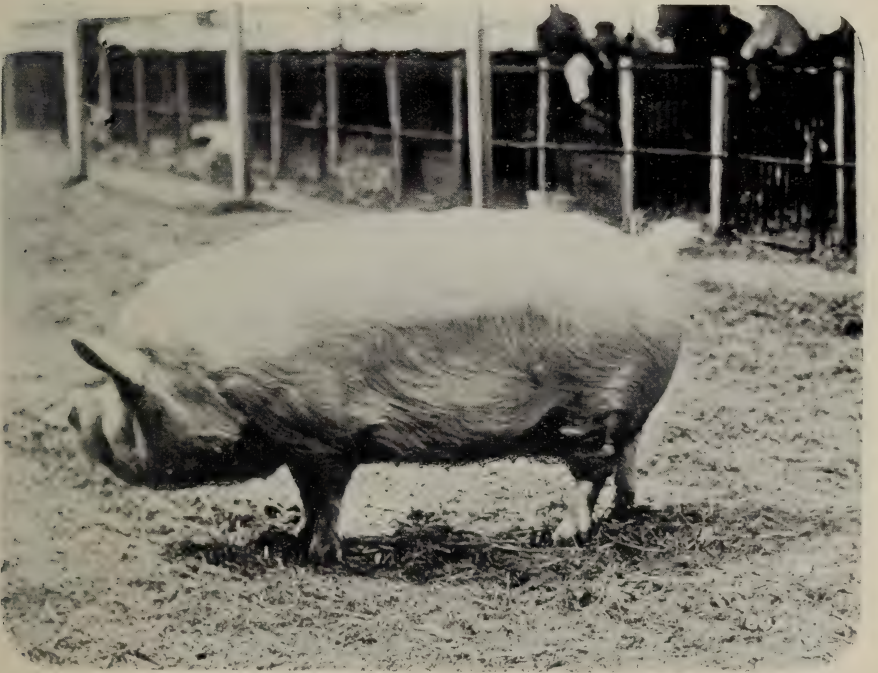
### Pigs.

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At the present time a good deal of discussion is taking place as to the advisability of converting mealies into pork and transporting them to the market in this form. Any attempt to do this with the hungry native beast will prove a failure. It will first have to be graded up and careful selection made of the grades, so that only those that develop the qualities of the improved breeds are used for increasing the stock.

In choosing a pig, especially a boar for breeding purposes, the aim of a farmer should be to obtain an animal whose shape approaches as near as possible to a parallelogram. A pig this shape contains the greatest weight for its size, and provides when killed the largest amount of the best parts. The particular points especially looked for should be as follows:—

The head should be set close to the shoulder and be wide between the ears, which should be thin and small; heavy, thick, hanging ears are an indication of coarseness. The neck should be long and muscular, and the chest wide and well let down; a narrow chest with both legs coming apparently from the same point is an objection. The greatest girth should be round the heart, and the sides should be deep and the ribs well sprung; this shape leaves plenty of room for the heart and intestines, and other internal organs, which are required to convert large quantities of comparatively cheap food into a large quantity of flesh and fat. The back should be long and straight, and the loin strong and not drooping; a weak and hollow back, and a narrow loin are both points care-



Middle White Boar and Sow.







Small White Boar and Sow.





fully to be avoided. The belly should be full, and the sow should have at least twelve teats. The tail should be set on high, and the legs straight, with flat bone; round bone indicates coarse bone, which is the least profitable part of the animal. The hams should be broad and full of meat to the hocks. The ankles and feet should be strong, compact and firm. The skin free from wrinkles, and provided with a fine and long coat; a coarse, curly, bristling coat, with a fringe along the top of the neck and shoulders is a sure sign of coarseness.

As the sole object in keeping and rearing pigs is to convert them in the shortest time into the greatest amount of good pork, or bacon, one or two very essential points must always be sought for. One of the most important is that the pig should have a vigorous appetite, as undoubtedly the more a pig will eat, in proportion to its size, the more profitable it will be; for digesting and assimilating all the food it eats the pig must have healthy internal organs, but they should not occupy a larger proportion of the carcase than necessary, as this portion of the pig is only a bye-product when converted into pork. Another necessary qualification is that the pig should have a quiet disposition, otherwise too large proportion of the food consumed goes to maintain the vital functions, which in a quiet pig is stored up as flesh, and the flesh of a coarse restless animal is sure to be tougher and less palatable than that of one that takes life easy, and fulfils in a steady, systematic manner the duties for which it is bred.

When a farmer starts with pure bred pigs, or crosses his common sow with a pure bred boar, he must realise that their progeny will require good care; the parent on the one side at least has been bred for years to produce the greatest amount of flesh in the shortest time, and this result has been attained by constant selection, and a generous provision of the best nutritious foods. He must not expect his young stock to pick up a living for themselves as the native pigs of this country have been accustomed to do for generations; if he follows this system he will find that his grade pigs very soon deteriorate; in fact they will probably prove less profitable than the native pig, whose ancestors have always foraged for themselves, whereas the improved pigs have a line of ancestors always accustomed to the best of care and food,

and they cannot give the best results without this constant attention. The pure bred boar is used to obtain pigs that will grow rapidly, but the pigs cannot be expected to do this unless supplied with a liberal amount of food; the aim of the pig breeder has not been to breed pigs that grow fastest on the least amount of food, that selection is done by nature, and amounts to the survival of the fittest, but good pigs must have good care. If this fact is not borne in mind many men will be much disappointed, and very probably disgusted, with the results they obtain from the use of a thoroughbred boar.

In his book on "Pigs," Mr. Sanders Spencer writes as follows on "The Selection of the Sow."

"If we apportion to the boar the chief influence in the formation of the young pigs, an equally, if not more, important duty falls to the share of the sow, to furnish the body with the necessary internal arrangements to enable the complete animal to readily convert its food so that the pig grows rapidly, fattens quickly, and proves itself a profitable hog.

"Some breeders exhibit a strong predilection for what is called a big roomy sow. With this view we are in accord, provided looseness and ungainliness of form do not accompany this size, as a more helpless and unsatisfactory brood sow does not exist than an unwieldy, flat-sided, weak-loined animal. An even-made, compact sow, with quarters long, wide and deep, and on short legs, will rear far more pigs, and at less cost, than will one of the very largest kind. As to the particular points to be sought for in a breeding sow these are very similar to those required in the boar, particularly the gentleness of disposition, as a barking, savage sow is seldom a good milker, and besides this there are frequently occasions when it is absolutely necessary to enter the sty in order to assist the sow in difficult cases of parturition, to remove the after-birth, and often to take the little pigs away.

"A well-formed udder is most necessary, and no sow should be bred from unless she has at least twelve teats, and if she has fifteen so much the better; these should be even in size, placed equidistant apart, and commence as near the forelegs as possible, and the whole of them should be milk-giving teats. An opinion appears to exist that the number of teats possessed by a sow is a sure indication of her prolificacy. Our experience leads us to hold

a different opinion, as sows with only ten or eleven teats have been known to produce seventeen and eighteen pigs at a litter. We strongly hold to the belief that the good, but somewhat unusual, quality amongst pure bred pigs of farrowing large trips of pigs becomes a more fixed quality of sows of a particular tribe or family than does that formation of the udder, which is considered desirable. It appears to be possible to so develop the powers of reproduction amongst sows that they become too prolific. We have several times experienced this, as young sows of certain families have farrowed from seventeen to nineteen pigs for a first litter. This is far too many for a young sow, if she be but a year old, as to bring up six or eight bonhams at the first attempt is quite enough of a tax on the really immature dam, particularly if she farrow between the months of April and September.

"A yelt will rear a greater number of pigs, with far less strain on her system, during the summer than the autumn, winter, or spring months. We have noticed that the best pigs of a litter are almost invariably those that suck from the teats nearest to the forearm, and that the best milking sows are those whose teats extend quite along the belly, some of them even showing between the hind legs. This quality of milk giving is not sufficiently studied by many pig breeders, who take it for granted that well nigh every sow which will produce pigs will, as a matter of course, furnish the latter with a good supply of lacteal food. This is an entire mistake, as there is nearly as much difference in the milking qualities of sows as in those of cows. Nor does the coincidence end here, since the good suckling sow is in many respects similarly formed as the heavy milking cow—thus both will be light in the neck, comparatively narrow at the top of the shoulder, long in the quarters, and, when in milk, light in the second thighs; both, too, will have the same gentle, quiet disposition, indicative of a desire to make the best of the good things which fall to their share from the feeding bin. A really good sow will require more care and a more nourishing diet when her pigs are three or four weeks old.

"Another quality, that of prolificacy, should be a requisite in the young brood sow, and this can only be secured by selecting the young stock from a breeder who has for some considerable period made this a particular



point in his system of pig management and breeding. It is quite possible to secure from a herd bred solely with a view to winning prizes a young sow which may prove to be prolific and a good suckler, but the chances are very much against such good fortune; and it is even within the regions of possibility to secure a young sow which will farrow large litters and yet fail to rear a decent litter of pigs, since the quality of milk giving does not by any means necessarily accompany prolificacy, although the reverse generally holds good."

### Feeding Standards (Wolff) for Growing Pigs per head per day.

| Age in months. | Weight. | Total Dry Matter. | Digestible Nutrients. |                                |                     |
|----------------|---------|-------------------|-----------------------|--------------------------------|---------------------|
|                |         |                   | Protein.              | Carbo-<br>hydrates<br>and Fat. | Nutritive<br>Ratio. |
| 2 to 3 ...     | 50      | 2.1               | 0.38                  | 1.50                           | 1 : 4               |
| 3 to 5 ...     | 100     | 3.4               | 0.50                  | 2.50                           | 1 : 5               |
| 5 to 6 ...     | 124     | 3.9               | 0.56                  | 2.96                           | 1 : 5.5             |
| 6 to 8 ...     | 170     | 5.6               | 0.58                  | 3.47                           | 1 : 6               |
| 8 to 12 ...    | 250     | 5.2               | 0.62                  | 4.05                           | 1 : 6.5             |

### GRAZING PIGS ON LUCERNE.

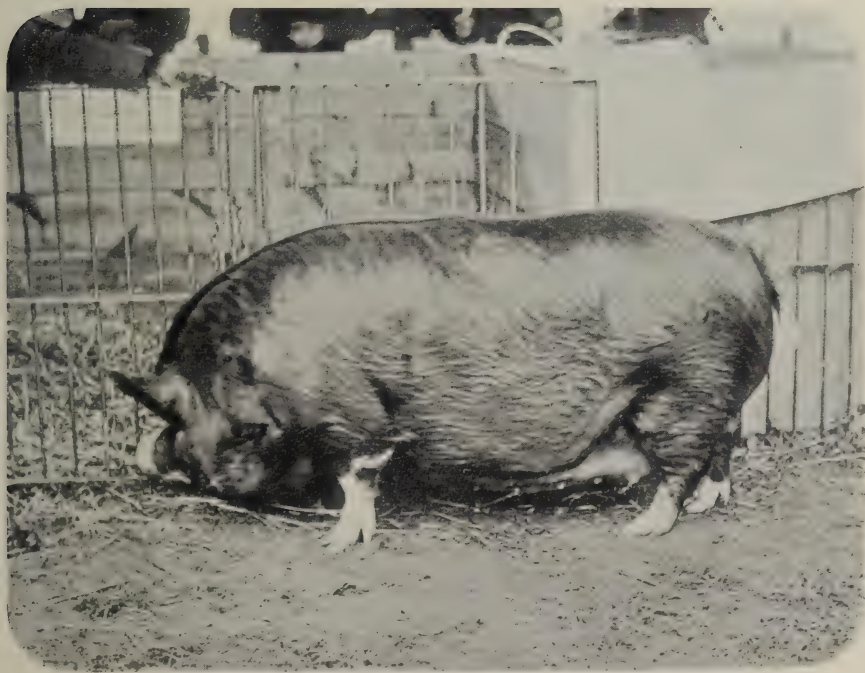
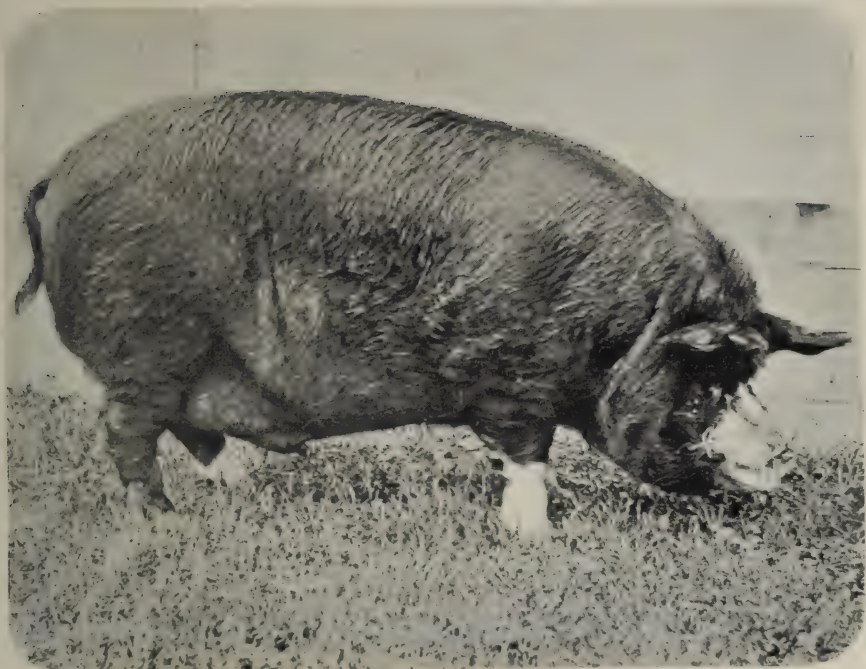
Lucerne is the natural food for swine. The pregnant sow on lucerne pasture generally needs no grain at all; at most, but a trifle of corn should she be in a thin condition when turned to pasture. Pigs born from sows pasturing lucerne are usually fine and strong. After they come, the sows need a little more grain than before and suckle profusely. The little pigs enjoy the sweet, tender herbage, and thrive on it; but they, too, should have a daily allowance of grain. This is not absolutely necessary, as in Colorado, Western Kansas, and Nebraska, many hog ranches are found where no grain is produced either in winter or summer, but only lucerne pasture in summer; but the pigs are often sold to farmers in the corn belt to fatten. It is economy to feed corn on lucerne pasture. Lucerne alone is too one-sided a ration; it is too rich in protein, and too poor in starch and fat. It builds the pig long and lean unless the corn is added, but the amount of corn should be very much less than is needed



Tamworth Boar and Sow.







Berkshire Boar and Sow.



on other pasture. In Kansas, the State Agricultural College has found that "at this station pigs were pastured throughout the summer on lucerne, with a light feeding of corn. After deducting the profitable gain from the corn the gain per acre from the lucerne pasture was 776 lbs. of pork. One lot of fattening pigs was fed all the corn they would eat, another lot all the grain and dry lucerne they would eat. The lot having lucerne hay made a gain of 868 lbs. of pork per ton of lucerne hay." —Jos. E. Wing, in "Penns. Bulletin."

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### **Cull Beans as Food for Pigs.**

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As farmers are turning their attention to the cultivation of beans, especially as one of the crops in a simple system of rotation, and also to the breeding and fattening of pigs, the following extract from a bulletin issued by the Michigan State Agricultural College will be of interest in showing the value of the unmarketable refuse from the bean crop.

It is estimated that at least 5 per cent., and in exceptional years, when the peculiarities of the season and weather conditions at harvesting are unfavourable, as high as 10 per cent. of the bean crop falls into the class known as cull or damaged beans. The object of the bulletin is to ascertain the different farm animals to which these may be fed, the gains that may be expected from their use, and the different methods of using them, to convert this important and cheap by-product into a marketable article.

Mixed with other grains, cull beans may be fed to sheep, and large quantities are used in this state for this purpose every year. It is reported that they are used as a food for dairy cows; they are also fed to swine, and it is as a swine food that they are to be considered in this article.

Pork from hogs which have been fattened quite largely on beans is generally soft and lacking in quality. It is generally conceded that bean-fed pigs store up a fat having a lower melting point, and consequently a softer fat, than hogs fed upon many other foods; and that a considerable portion of the element called quality in pork



is dependent upon the melting point or character of the fat stored up. In the case of mutton finished upon beans no such criticism has been made, probably because there is relatively less fat in the carcase of the sheep, and its character is not so essential to the quality of the meat as in the case of the pig.

A still further reason for conducting the experiments here reported is that a cheap food must generally be selected to produce pork with reasonable profit. There are, of course, exceptions, but usually the profits accruing from rearing pigs for slaughter on mill feeds alone is extremely small. It is the nitrogenous or protein element in the feeds which is the most expensive factor, and feeds rich in protein are consequently high in price. As the necessity for the nitrogenous element in food has become better known, and its place in the economy of feeding better understood, the feeds rich in protein have been more and more sought for the growing animal. It was then in an attempt to discover in how far the growing pig could profitably be compelled to rely upon the bean factor in his food for his supply of protein that one of the series of trials here reported was undertaken.

Investigations were carried on with two different classes or weights of hogs, representing two of the stages of pork production, the one—the growing period—commencing a little after weaning at about 50 pounds weight, and closing at about 150 pounds; the other—the fattening or finishing period—beginning at about 150 pounds and ending from 225 pounds to 250 pounds.

*Beans for Growing Pigs.*—Six trials were made with cull beans and growing pigs. Two different combinations of feed were tried, and two check lots were fed for comparative purposes. The farmer frequently asks that feeding trials may be made with feed combinations, all factors of which may be produced on the farm. Accordingly four trials were conducted using mealie meal with beans, two using mealie meal, middlings and beans, and two using mealie meal and skim-milk.

*Rations.*—In both cases the rations consisted of beans three parts and mealie meal four parts by weight. The preparation of the mixture was as follows:—The dry beans were weighed out, placed in the food cooker with sufficient water and cooked until done, or until all were soft. The cooked beans, including the entire contents of the

kettle, were then transferred to a barrel, the proper amount of mealie meal added and the whole thoroughly mixed. From this mixture the pen of pigs was fed as much as they would readily consume and still show good appetites and eagerness for the next feed. During warm weather it was necessary to cook the food often and in small quantities to prevent excessive souring.

TABLE I.

| Lot. | Initial Weight. | Closing Weight. | Total Gain. | Average Gain per head per day. | Food Consumed. |              |
|------|-----------------|-----------------|-------------|--------------------------------|----------------|--------------|
|      |                 |                 |             |                                | Beans.         | Meal e Meal. |
| 1    | 228·6           | 507·6           | 279         | ·797                           | 426            | 568          |
| 2    | 185             | 447·6           | 262·6       | ·93                            | 400            | 533          |
| 3    | 224·3           | 510             | 285·7       | 1·02                           | 396            | 528          |
| 4    | 222·3           | 513·6           | 291·3       | 1·04                           | 396            | 528          |

It will be observed from the table that the average gain per head was less than eight-tenths of a pound per day in lot one, while in lot four, which made the largest daily gains, it was only a trifle over one pound per day. With the conditions under which these pigs were fed, these gains could hardly be called satisfactory. An examination of the records of lots 7 and 8, which follow in this series, will show that they were from the same litters as those of lots 3 and 4, and were fed skim-milk and mealie meal as a check ration. Their daily gains were one-third of a pound more, and at the close of the feeding period they averaged 25 pounds more per pig than those fed on mealie meal and beans.

*Trials 5 and 6.*—From daily observation of the four lots which were fed on beans and mealie meal, it was apparent that the food combination, while it possessed the proper amounts of carbohydrates and protein, was not well enough adapted to the requirements of the pigs to produce adequate growth. It was thought that the introduction of a less concentrated food factor would give variety to the ration, and at least a physical composition better suited to the age and digestive powers of the pigs. Accordingly middlings was substituted for a part of the beans used.

*Rations.*—The rations of both lots were the same, and were made up of mealie meal three parts, middlings two parts, and cull beans two parts.

TABLE II.

| Lot. | Initial Weight. | Closing Weight. | Total Gain. | Average Gain per head per day. | Food Consumed. |              |
|------|-----------------|-----------------|-------------|--------------------------------|----------------|--------------|
|      |                 |                 |             |                                | Skim Milk.     | Mealie Meal. |
| 7    | 221·6           | 602·6           | 381         | 1·36                           | 3480           | 696          |
| 8    | 223             | 594·6           | 371·6       | 1·32                           | 3480           | 696          |

From the above it will be observed that the daily gains per head ranged between 1·32 pounds and 1·36 pounds, the average for all being approximately one and one-third pounds. While the gains obtained with the above food combination were not exceedingly large, they were sufficient, in view of the restraints generally necessary with experimental pigs, to be called quite satisfactory.

## CHECK LOTS.

*Skim-milk and Mealie Meal.*—In the whole list of feeds suitable for pig-growing which are available to the farmer, probably the one which he would choose first would be skim-milk. Certain it is that such uniformly good results have been obtained from its use that a ration of which it forms a reasonable part is, in popular opinion, a standard, and has been used quite widely for check, or comparative purposes in swine experimentation. It was adopted in this experiment as a check protein feed with which to compare cull beans, and a mixture of cull beans and middlings, the carbohydrate portion of the ration in each case being obtained from mealie meal.

*Trials 7 and 8.—Rations.*—The ration in each case was composed of a mixture by weight of skim-milk 5 parts and mealie meal 1 part, weighed and mixed at the time of each feeding. The milk was sour when fed, but no portion of it was allowed to stand in the barrel more



than twenty-four hours before use. The results are set forth in the following table:—

TABLE III.

| Lot. | Initial Weight. | Closing Weight. | Total Gain. | Average Gain per head per day. | Food Consumed. |              |
|------|-----------------|-----------------|-------------|--------------------------------|----------------|--------------|
|      |                 |                 |             |                                | Skim Milk.     | Mealie Meal. |
| 7    | 221·6           | 602·6           | 381         | 1·36                           | 3480           | 696          |
| 8    | 223             | 594·6           | 371·6       | 1·32                           | 3480           | 696          |

From this table it will be observed that lot 7 gained a total of 381 pounds, or an average of 1·36 pounds daily for the entire feeding period of seventy days.

## PART II.

### *Cull Beans for Fattening Pigs.*

In making this portion of the report, we must repeat what has previously been mentioned relative to the influence of beans on the quality of the pork produced, and add that "Canadian packers have observed that shipments coming from the bean-growing districts of Ontario contain a large percentage of 'softs.'"

From many enquiries and reports received from the farmers of the state, it was known that many were using beans alone for fattening pigs. Some of these told of large gains and others of unsatisfactory ones. Some that had mealies were even selling them and buying damaged beans, feeding these exclusively, instead of making a combination of the two feeds. Such feeding must necessarily be accompanied with some losses of protein, and from the standpoint of food economy, is open to considerable criticism. However, if beans were cheap, the practice might be financially allowable. When any feed is cheap, and a large stock of it is on hand, there is a great temptation to supply it too freely and to feed it to the exclusion of other feeds which experience and judgment would suggest.

A series of three comparisons were made between the exclusive bean ration for fattening hogs, and one composed of equal parts of beans and mealie meal.

In each comparison the duplicate pens of pigs were from the same litter, and their previous feeding and management had been the same. They were divided as evenly as could be as to weight, sex, and general thrift, and every precaution taken throughout the experiments to have an equality of all surrounding conditions. In each case there was a preliminary feeding period of about ten days, to gradually accustom the several pens to their respective feeds, after which they were again weighed for the experiment proper.

In these as in all the other tests, the initial and closing weights were each the average of three weighings made at 10 a.m., 2 p.m., and 4 p.m. of the starting and closing days.

As has been previously stated, it was the intention to start as nearly as possible at an average of 150 pounds weight, and close the work as soon as either pen averaged 250 pounds.

In Comparison No. I. the feeding period was seventy days. In Comparisons No. II. and III. it was 56 days. However, in the case of comparison No. I., two of the six pigs fed on the exclusive bean ration went so badly off feed during the first two weeks that at the end of the second week they were withdrawn from the experiment, and the remaining four weighed in again; consequently the gains for Pen 1 are computed for eight weeks instead of ten, as in the case of Pen 2.

The following tables present the facts in condensed form, each of the six pens being given a separate number to prevent confusion:—

### COMPARISON I.

| Pen Number. | No. of Pigs in Pen. | Initial Weight. | Closing Weight. | Total Gain. | Average Gain per head per day. | Food Consumed. |              |
|-------------|---------------------|-----------------|-----------------|-------------|--------------------------------|----------------|--------------|
|             |                     |                 |                 |             |                                | Beans.         | Mealie Meal. |
| 1           | 4                   | 578             | 821.6           | 243.6       | 1.08                           | 1075           | ...          |
| 2           | 6                   | 874             | 1504.6          | 630.6       | 1.50                           | 1268           | 1268         |

## COMPARISON II.

| Pen Number. | No. of Pigs in Pen. | Initial Weight. | Closing Weight. | Total Gain. | Average Gain per head per day. | Food Consumed. |              |
|-------------|---------------------|-----------------|-----------------|-------------|--------------------------------|----------------|--------------|
|             |                     |                 |                 |             |                                | Beans.         | Mealie Meal. |
| 3           | 4                   | 694'3           | 962.3           | 268         | 1'19                           | 1066           | ...          |
| 4           | 4                   | 679'3           | 1032            | 352'7       | 1'57                           | 730            | 730          |

## COMPARISON III.

| Pen Number. | No. of Pigs in Pen. | Initial Weight. | Closing Weight. | Total Gain. | Average Gain per head per day. | Food Consumed. |              |
|-------------|---------------------|-----------------|-----------------|-------------|--------------------------------|----------------|--------------|
|             |                     |                 |                 |             |                                | Beans.         | Mealie Meal. |
| 5           | 4                   | 684'6           | 916'6           | 232         | 1'03                           | 995            | ...          |
| 6           | 4                   | 675'3           | 1012'3          | 337         | 1'50                           | 685            | 685          |

A study of the tables reveals the fact that there are greater variations in gains, and consequently in cost of the same in the case of the bean fed hogs than with those fed on the mixed rations. From daily observation of the several pens while on feed it was also apparent that greater individual differences were developed with those pens which received the exclusive bean ration. That is to say, that some of the hogs receiving beans only, either by reason of their stronger constitution or better digestive and assimilative capacities, or for still other reasons, seemed able to adapt themselves to the food given better than others receiving the same food from the same trough. There are, of course, individual differences and individual peculiarities which appear in all feeding operations, but these are intensified, or at least rendered more apparent, when feeding an extremely narrow or an extremely wide ration. Consequently less uniformity of results could be expected from the use of wide or narrow rations than from balanced rations.



A summation of the results obtained from each of the combinations of feeds, arranged in separate groups is given below:—

### SUMMARY FOR BEAN FED HOGS.

| No. of Pigs. | Initial Weight. | Closing Weight. | Total Gain. | Average Gain per head per day. | Total lbs. Beans consumed. | Lbs. Beans consumed per cwt. Gain. |
|--------------|-----------------|-----------------|-------------|--------------------------------|----------------------------|------------------------------------|
| 12           | 1956·9          | 2700·5          | 743·6       | 1·1                            | 3130                       | 420·9                              |

### SUMMARY FOR BEAN AND MEALIE MEAL FED HOGS.

| No. of Pigs. | Initial Weight. | Closing Weight. | Total Gain. | Average Gain per head per day. | Food Consumed. |              | Lbs. of Food per Cwt. Gain. |              |
|--------------|-----------------|-----------------|-------------|--------------------------------|----------------|--------------|-----------------------------|--------------|
|              |                 |                 |             |                                | Beans.         | Mealie Meal. | Beans.                      | Mealie Meal. |
| 14           | 2228·6          | 3548·9          | 1320·3      | 1·52                           | 2683           | 2683         | 203·2                       | 203·2        |

From the above summaries it would appear that hogs of the weights and ages of those fed in this experiment could reasonably be expected to make a gain of about a pound per day on a ration consisting of beans only, and that the same sort of hog could reasonably be expected to make a gain of  $1\frac{1}{2}$  pounds per day if an equal amount of mealie meal were supplied with the bean ration. One thing is certain, if the cost of additional labour and equipment is eliminated, the gains from the exclusive bean rations are cheap. But the cheapest way is not necessarily the most feasible way, or the one giving the greatest profit. In order to better ascertain more of the real differences which cannot be made to appear in a simple table of weights, gains, etc., two swine experts of wide, practical experience, were asked to look over pens 3, 4, 5, 6, at the close of the experiment and make a valuation of the same from a market or butcher standpoint. Each man made an independent estimate, and the average of the estimates was then taken. Pen 4 was rated five-sixteenths of a cent higher per pound than Pen 3, and Pen 6 was rated at five-eighths of a cent higher than the corresponding Pen 5.

## PART III.

## NOTES ON MANAGEMENT.

*Cooking.*—Beans can be fed to swine only in the cooked form. The pig seems to be unable to utilise beans which are at all hard or firm, even though they have been boiled for some time, hence it is very essential that they be thoroughly cooked. To supply a single feed of half-cooked beans to a pen of hogs, robs them of their appetites and relish for their food, if indeed it does not put them off feed. The cooking should be conducted in an even more careful manner than it would be in preparing them for human food. It will materially shorten the cooking period, and give better results, if the beans are soaked an hour or two, or better, overnight, before the cooking proper is begun.

The amount of water used will be governed somewhat by the way the beans are to be fed, whether they are to be mixed with other feeds or fed alone. In either case the water content of the ration should not be above the bodily requirements of the pigs fed; in fact, it is usually better to have the water content of the ration below the daily requirement of the pig, and then allow the pig access to water at will or supply it regularly. When the food is excessively sloppy, the pig is compelled to consume unnaturally large amounts of the ration given in order to properly supply his bodily needs. This distends the stomach, unbalances the whole digestive system, and makes a paunchy, ill-formed pig, and one which, at slaughtering time, yields a very low per cent. of dressed carcass. Such feeding is neither good practice nor good economy.

There are two ways of cooking, the one by injecting live steam into a barrel containing the food to be cooked, the other by the use of the ordinary feed cooker, consisting of a caldron kettle with a cast iron stove as a jacket for the same. A large variety of cookers of a similar sort are upon the market. In cooking small amounts, the kettle gave the better results, while the steam was more convenient for larger quantities.

*Foreign Material.*—All refuse grains contain more or less foreign material. Cull beans are no exception to the general rule, perhaps the most objectionable ingredient being the gravel stones. In some samples there was from

five to seven per cent. of gravel stones. These are not only an annoyance in cooking, but their feeding value must be rated as low as any other possible ingredient. By the use of a hand fanning mill adapted for bean cleaning, a considerable portion of the stones may be eliminated.

*Salt.*—In the use of salt with pigs to which salt has not been supplied regularly, care must be taken to offer it in small quantities at first. When supplied suddenly or in excessive quantities very serious, or even disastrous, consequences may follow. Always keeping this caution in mind, it will be found advantageous to use some salt with every mess of beans cooked, about the same amount as would be used for human food will probably be sufficient.

Salt is an appetizer, and renders the food more palatable. It also possesses laxative properties, and on this account will be found valuable to use in connection with any ration containing beans.

From the use of beans, both with and without the addition of salt, there seemed to be a greater difference than could be accounted for by the reasons just given for its use. Foster, in the Text Book of Physiology, speaking of the whole class of salts, says "their presence is in some way essential to the various metabolic processes; hence they need to be always present in daily food. In what way it is that they thus direct metabolism we do not know, but we are aware that the properties and reactions of various proteid substances are closely dependent on the presence of certain salts." In the use of the exclusive bean ration which the reader knows has a very high protein content, such marked differences were noticeable with and without the use of the salt that it seems to those having the work in charge that the salt supplied was a very material assistance in elaborating or metabolising the large supply of protein the pigs were receiving. Be this as it may, however, it is certainly an advisable practice to salt all beans that are to be used for swine feeding.

*Getting on Feed.*—It is a general rule in all feeding operations that when any change is to be made in the ration of an animal it should be done gradually. This is especially applicable in the use of a ration containing any large quantity of beans.

*Temperature of Food.*—In winter feeding it will be advisable to supply the food while warm, but in the use of all warm feeds every painful should be stirred till it is



at an even temperature, and then tested with the finger. It is a cruel neglect to supply hot food to a hungry pig. Sore mouths, dislike of food, and apparent loss of appetite, are sometimes traceable to no other cause. Such mistakes will sometimes occur unless the feeder adopts the plan of stirring and testing every pail fed.

*Kettles and Barrels.*—Pails used should be rinsed after each feeding, and especial care should be taken to clean the kettle or barrel after each cooking, and not allow sour or mouldy material to collect about the food receptacle. More than one case of supposed hog-cholera has been traced to ignorant or careless neglect in allowing old swill to accumulate in a barrel instead of emptying the barrel each time before the new material is dumped into it.

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## Poultry Notes.

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### SETTING HENS.

For those who do not intend rearing chickens on a large scale, the ordinary means of hatching the eggs under broody hens is naturally adopted. When poultry are raised in their thousands this method has been almost entirely superseded by hatching in incubators and rearing the chicks in artificial brooders, thereby reducing the labour to a very great extent.

Hens are by many people allowed to choose their own nests, and often in these cases the results are excellent, but if they are endeavouring to improve their stock, and build up a laying strain, it is not profitable to allow the best layers to waste their time hatching out and rearing a brood of chickens, and therefore those birds who are not included in the breeding pen must be employed for sitting. If hens are allowed to sit where they can be interfered with by other birds, especially other laying hens, considerable trouble is often experienced by these birds laying their eggs in the nest, whereby the fresh egg is wasted, as in this warm climate the embryo or germ of the egg very quickly starts to develop, besides which the broody hen has more eggs than she can cover, and consequently allows a different one to get cold each day

in her endeavour to do the best for them all. Broody hens should be placed in a room set apart for the purpose of hatching where they cannot be disturbed by the other stock, but any number of sitting hens may be kept together in the one place. The room used for the purpose should be if possible kept at an even temperature and not allowed to get too hot, it should also be kept fairly dark, the light being admitted on to the floor space where the hens eat and bath.

An ordinary pole and dagga hut is excellent for the purpose. The nests, a separate one for each bird, should be raised off the ground, as they are then not so liable to harbour vermin. A good plan is to fix a platform along the wall of a room, three feet from the ground, the platform being about two and a half feet wide. Divide this platform into little stalls or nests, each one foot wide, two feet long, and one foot high. This leaves a six inch walk along the front of the nests for the hens to light on when flying up from the floor. If much space is required a double row of nests can be provided one above the other. Each nest should be closed by means of a door made of laths, to provide ventilation, hinged at the bottom, and opening outwards. The inside of the nest should have a low partition dividing it into two equal parts; at the back end of the nest, the nest proper is made, and the materials used are prevented from being scattered by the partition, which should be about three inches high. The front part is left bare and is available for the hen should she wish to leave the nest. It is also useful in the case of bad sitters, who would otherwise stand upon and probably break the eggs, and if one egg is broken in a sitting all the others must be washed, otherwise the pores in the shell of the soiled eggs become blocked up and the chickens contained in them are unable to obtain sufficient air and die in the shell.

The nest proper should be made of an inch or two of dry earth arranged in the shape of a saucer, over which should be sprinkled some insect powder or disinfectant to keep away the lice, and on the top of this some soft hay. When a hen becomes broody she should be placed in one of these nests, with a china egg to sit upon, and the door closed; it after a day or two she seems quite contented, she can be trusted with thirteen eggs, or as many as she can safely cover. Each morning the hens

should be allowed off the nest for ten to fifteen minutes, to eat, drink, and take a dust bath, but they should not be allowed outside the room altogether. The hens will probably return to the nest of their own accord; if they remain off too long they should be caught and replaced without unnecessarily exciting them. Mealies should be fed during the period of incubation as they help to maintain the heat of the body; clean cold water should also be available in abundance. And of equal importance with the food is the dust bath, which should be made of a mixture of earth, ashes, and a little sulphur. If sitting hens have not this means of cleaning themselves provided they become infested with lice, and the chickens, when hatched, are immediately attacked by these parasites and in consequence do not thrive as well as they should. When setting hens it is always best to sit several at the same time; the eggs under them all are then tested all together, usually on the seventh evening, and the unfertile eggs are removed. All the fertile eggs are then placed under one or more hens according to the number left; by doing this one or two hens are very probably released from sitting, and they can either be cured of their broodiness or have a fresh batch of eggs put under them. When the time for hatching arrives this system is also convenient, as all the chickens are hatched on the same day, and as many as twenty-four to thirty can be given to one hen to rear; the birds that are deprived of their chickens, if good sitters, can be set to hatch another batch of eggs. Good sitters will hatch as many as three lots of eggs consecutively, at the end of which time they should be allowed to rear a brood, or at any rate not be expected to remain still in one position for more than nine weeks, the only danger of keeping them so long on the nest is that they sometimes develop the evil habit of egg eating towards the end of the time. Before sitting a hen she should be thoroughly dusted with fresh insect powder, working it thoroughly into her feathers, and especially round the vent.

### REARING CHICKENS.

After a hen has been sitting for twenty or twenty-one days, the chickens in the eggs under her should begin to chip the shell. As they will not all come out at the same



time, those hatched first should be removed, lest in her excitement the hen leaves the nest too soon and allows the staler eggs which hatch last to get cold. When all the chickens are hatched the hen should be placed with them in a closed coop, about thirty inches square, with a hinged roof and a movable floor, which can easily be removed each morning to be cleaned. In front of this coop a small run four by five feet and eighteen inches high should be fixed; the sides of this run should be made of wire netting of one inch mesh, with two inch mesh wire netting on the top. For the first week the hen and chickens should be confined to this run, the position, however being changed on to fresh ground each day. At the end of the first week or ten days the chickens may be allowed more liberty, but care must be taken that they do not get out too early in the morning while the grass is still wet; the hen, however, should still be confined, otherwise she will take them too far and tire them out in her search for food.

A good food for chickens when first hatched is a bread made of a mixture of three parts mealie meal, one part wheat bran, one part flour, and skimmed milk or water, mixed very dry, and salted, as is usual for bread; bake thoroughly, and when well done, if not dry enough to crumble, break it up, dry out in the oven, and then grind in a mill; to this should be added the unfertile eggs, taken from the sittings when tested, boiled hard, and ground shell and all in a mincing machine. The proportion should be one part minced egg to four parts of bread crumbs, rubbed together till the egg is well divided. This mixture can constitute one half of the feed till the birds are five or six weeks old. This food should be fed on plates or in troughs and only left before the chicks for five minutes; this ensures sharp appetites at meal time, and guards against inactivity which comes from over feeding. The other food, consisting of small grains, and pin-head oatmeal, should be scattered on the floor of the run, and slightly buried in grit or short straw, so that the birds have to scratch to get at it. Charcoal, crushed bone, oyster shell, and sharp grit, should always be kept before them, and clean water, shaded from the direct rays of the sun. Green food, such as lettuce, or sliced turnip and beetroot should also be provided, at which the chicks will soon learn to pick.

The aim of all poultry keepers should be to bring their cockerels on as rapidly as possible, and their pullets to start laying when eggs are most scarce. For this purpose a ration containing a good proportion of nitrogenous food, with cut green bone three times a week, will be found most successful; care, however, must be taken not to force the pullets too much, so that instead of starting to lay when the older birds are moulting, they moult also, and in consequence at the scarce time few eggs are forthcoming from the whole flock.

The cockerels should be separated from the pullets as soon as the difference in sex can be determined, and when the cockerels are three months old they should be ready for fattening for the market. The sooner they can be got ready for fattening the better, as the younger the birds are the more they gain in the process. No cockerels, except those reserved for breeding purposes, should be kept on the place over four months; after this they will probably cost more to keep than they are worth.

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## Utility versus Fancy Poultry.

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BY A FARMER'S WIFE.

Now that our Agricultural Shows are upon us, a word on the above subject may not be out of place.

In the first instance, I do not object to Fancy Poultry as fancy poultry, but there is a wide difference between the fancy bird bred entirely for exhibition and the bird bred for egg production. As a rule the bird taken up by the fancy is ruined as a utility bird. Take the oldest known breed, the English Game; these had always been bred from the birds that had trodden down their opponents in the cock pit, and in consequence were very hardy. What did the fancy do for this breed? It bred birds with legs two feet long, and body three pounds weight, and to get back to the original breed two classes had to be made.

Take the Langshan—it was altered from a Dorking-shaped bird to a bird on stilts. As an instance, I have

seen Brahmas advertised as having eight inches of feathers right to the end of the middle toe; Minorcas and Leghorns as having so many inches of comb and wattle, Wyandottes every feather laced, and so on. I am only giving the above references to give an idea that although a bird may win a Crystal Palace Cup it may be no use for the farmyard. One most remarkable feature of the last year's Utility Poultry Club's Laying Competition was that the two pens of Leghorns most admired were lowest down in the list in egg production.

Now, as we are a young country, I contend that we have no use for fancy poultry in our show yards, if we have fancy poultry and fancy judges the farmer will go out of poultry exhibiting altogether, as he has done almost in the Old Country. I should, therefore, suggest that our judges should be breeders of experience with an egg basket and breast meat object ultimately in view. Any judge who goes by the card principle must in the end be a failure.

In conclusion, I may say that poultry shows have done more harm than good to our useful breeds of poultry. On the other hand, laying competitions and dead poultry shows have done a tremendous amount of good. I consider that our egg standard in this country is very low. This, I take it, is the result of birds being imported without any egg record, or very little. I should like to see a pen of birds from a good high standard imported just to see how we stand compared with other countries.

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## German East African Cattle.

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The two illustrations of these cattle are of a mob brought down by Messrs. Ross and Partridge.

The cows, though small, should be useful for grading up, as the bull calves grow considerably larger than their dams, and make good slaughter and trek oxen.

The cattle keep remarkably free from ticks; this alone should be a great point in their favour, especially if the grade stock retained the same immunity.





German East African Cattle.



## The Fruit Fly.

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This destructive insect has been causing considerable damage in citrus orchards this season. The life history and habits of the fruit Fly (*Ceratitis capitata*) have been studied by C. W. Mally, M.Sc., Entomologist of the Eastern Province, and the following article is taken from the published results of his observations printed in the Cape Agricultural Journal.

The adult insect though bright coloured often escapes notice, and the first indication of the damage done by it is the falling of the fruit, which, on being opened, is found to be infested with one or more maggots. The fruit fly does not confine its energies to citrus fruits alone, peaches, plums, apricots and apples are all stung by the female fly and prove a suitable hatching place for the eggs, and provide nourishment for the maggot when hatched.

This general taste on the part of the fly enables it to find suitable food during a great part of the year, and it has been ascertained that females can live for several months under natural conditions till more fruit is available in which to deposit their eggs.

The life history of the fly is as follows:—

Eggs are laid just under the skin of the fruit, sometimes singly, sometimes several together. For this purpose the female is provided with a sharp ovipositor with which she pierces the fruit and at the same time lays the eggs. If the fruit is not sufficiently ripe the eggs do not seem to hatch so readily, or if they hatch the maggot soon dies; in ripe fruit the eggs hatch in from two to four days.

As soon as the maggot is hatched it begins to feed on the pulp of the fruit, working its way to where it is sweetest and most ripe.

The presence of the maggot in the fruit causes it to drop from the tree; this usually takes place shortly before the maggot is ready to emerge from the fruit and go through the next stage of its existence, although some-



times the maggot leaves the fruit and falls to the ground before the fruit has fallen.

The maggot or larva stage of the insect lasts from fourteen to twenty-one days.

On emerging from the fruit the maggot hides in the ground, burying itself about an inch under the surface, or less, according to the nature of the soil. Here it soon changes to puparium, in which stage it remains from twelve days to three weeks, according to the season, and eventually emerges as an adult insect, which soon after coming to the surface of the ground is ready to fly and seek for food. The life of the adult insect is of uncertain duration, but probably it lives for several weeks, and after laying all its eggs dies.

The fruit fly is fond of sweet foods, such as the juice obtainable from injured fruit. This fact provides one means of checking and destroying the insects. A solution of one pound of arsenate of lead and five gallons of treacle in two gallons of water is found to be fatal to them, and if this can be sprayed over the trees so that very small drops adhere to the leaves and fruit, many flies will feed on the sweet mixture and be poisoned. This spray is, however, easily washed off by rain, and thus it is most effective when applied during the dry season on citrus trees, where it will remain for some time. Another means of controlling this pest is to destroy as many of the maggots as possible; in some cases the maggots leave the fruit a few hours after it has fallen. From this fact it is seen that the fallen fruit must be collected carefully and frequently; it should be picked up at least once a day, and if possible oftener. Frequent stirring of the land with a cultivator will help to destroy those maggots that have already entered the ground, and very few will escape if the poultry can be taught to follow the cultivator, and this they very soon learn to do. Where the trees are large and spreading it is difficult to cultivate close up to the trunks, and here many maggots may escape destruction. When the fallen fruit has been collected it should be carefully destroyed, either by boiling or by being placed in a barrel or tank with just enough water to cover it and allowed to ferment, this destroys all the maggots. Feeding pigs on the fallen fruit is not always satisfactory, as unless the pigs promptly demolish

all the fruit some maggots are sure to escape and hide themselves in the ground, and eventually emerge as adult insects ready to start another generation.

If the fallen fruit is buried it must be covered with at least a foot of earth, and well stamped, otherwise adult flies will find their way to the surface, and the precautions taken will have been in vain. The only means of preventing the fruit being stung is to enclose the trees in cotton netting, with ten meshes to the inch, for at least one month before the fruit ripens, if the fruit is stung before this time the eggs or maggots will probably perish. This netting can be procured from the Agricultural Department, and is useful not only in protecting the fruit from the fruit fly, but also from birds and other fruit-eating insects. The netting is made in bales forty-eight yards long and is seventy-two inches wide. The best means of placing it over the trees is first to sew two or more lengths together, according to the size of the tree, the wide net is then lifted over the tree by means of two blunt poles, and cut off from the main piece, leaving enough to allow about four to six inches to lie on the ground on either side of the tree. The four corners are then drawn together and tied. The sides of the net will still be open, these should be drawn together and either sewn or pinned. Pinning is perhaps best as it is less trouble to undo when the time for picking the fruit arrives. The nets, if carefully used, will last for two or three seasons, but if the trees have sharp branches sticking out from the top the net is liable to get torn in the wind.

When picking the fruit it is most important that the trees should be picked absolutely bare, all undersized and immature fruit should be removed and destroyed, otherwise these provide a breeding place for the fly in which they are able to survive till the next crop of fruit is sufficiently ripe for them to attack.

Fruit Fly are no doubt carried about the country in infested fruit, especially is this the case when fallen fruit is exposed on the market for sale. It usually fetches a very small price, and the purchaser, on opening it, finds much of it worthless and throws it away, little thinking of the risk he is running of infesting his own or his neighbour's fruit trees, which may be free of the fly.

## **Inter-Colonial Locust Bureau.**

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### LEAFLET No. I.

The locust plague in South Africa has become such a menace to the farmers that it is felt that there should be some concerted action among the South African Colonies and territories to combat this pest. Our present knowledge of the movements of locust swarms is very limited, and an individual territory is very seriously hampered in its efforts to combat the locust pests, by not knowing how large an invasion of locusts to expect at any time from neighbouring territories. For this reason, at a conference held in Pretoria in 1906, it was decided to establish a central bureau, at Pretoria, for the collection of information throughout South Africa regarding position and movements of locusts.

Cards are distributed by each of the Colonies or territories subscribing to this bureau, upon which the required information can be reported to the person or department in that territory who is in charge of the locust destruction work. These cards will then be forwarded to the central bureau in Pretoria. It is the duty of this bureau to tabulate and record all such information received, and to issue to each subscriber, weekly or monthly, reports as necessity may demand, showing the exact position and movements of the locusts throughout the whole of South Africa. This report will be sent to the person or department in charge of locust destruction, and the farmers in threatened areas can then be prepared to receive flying swarms when they arrive. If occasion demands, special reports by telegram or letter will also be issued. Furthermore, a forecast can be made from these reports as to where locusts will lay their eggs, and preparations can be made to destroy the young voetgangers as soon as they hatch out and when they are in the stage most easily destroyed, and before they have done much damage. These reports, aside from being of practical use in giving the farmers more confidence in planting crops, will, in a few years, be of considerable scientific value in throwing light upon the life history of the locusts and their movements throughout the sub-continent.



The cards which have been issued for the purpose of making reports should give the following information:—

1. Date upon which the observation was made, and the hour of that day;
2. Place at which the observation was made, if possible name and number of the farm;
3. As to whether the locusts were fliers or voet-gangers;
4. The direction in which the swarm was flying, according to the points of the compass.

And any other information which may be considered of use, such as—whether locusts were laying eggs, destroying crops, enemies attacking them if any, when eggs hatch, when voetgangers obtain wings, when such new swarms fly away, size of swarm, etc., etc.

These cards should be sent in promptly, and always bear the name and address of the sender, but nil reports are not necessary unless asked for specially. It is suggested that they be issued to all inspectors of government departments, railway station masters, farmers' associations, or agricultural societies, missionaries, medical officers of health, district veterinary surgeons, prominent farmers, and anyone else who will send in reports.

There are two species of migratory locusts in South Africa: the *Brown Locust* and the *Red Locust*.

#### THE BROWN LOCUST (*Pachytylus sulcicollis*).

The brown locust is the smaller of the two, and is about two inches long, of a dark brownish colour, with transparent colourless hind wings. This locust is found in the Cape Colony, German South-West Africa, O.R.C., Bechuanaland, the western half of the Transvaal and Rhodesia. Evidence goes to show that these locusts spend the latter part of summer and the early winter in the region of the Kalahari Desert. In from March to May—depending upon the season—swarms of these locusts fly out and cover large areas in the regions mentioned above. When the breeding season arrives they turn to a slaty colour and begin to deposit their eggs, generally in from June to August. The eggs do not hatch until after the first heavy rains of the summer. The

voetgangers are at first black in colour, but later are marked with large spots of reddish brown on the head and thorax; even when very young they collect in large swarms and move across the country, taking all the crops as they go. Early in December they begin to get wings, and by the 1st of January, or earlier, begin to fly away to their quarters in the Kalahari, where they remain until next March or May. This locust is more dangerous to crops, as it appears at a time when they are the more easily destroyed.

## THE RED LOCUST

(*Cyrtocanthacris septemfasciata*).

The red locust is much larger than the brown locust, being about two and a half inches long, of a reddish brown colour, with a large purplish spot at the base of the hind wing, and with several very distinct dark coloured bands crossing the wing covers. It is easily distinguished from the brown locust by another character which is constant in both immature and mature stages. Just behind the head, and between the front pair of legs, is a sharp spine or tubercle, which is always lacking in the brown locust. The voetgangers are very slender, of a dark grey colour with a yellow mark on the thorax. The legs are lighter in colour, except that on the thigh of the hind legs is a large black band. The red locust is found on the Eastern Coast of South Africa, *i.e.*, the eastern and south-eastern part of the Cape Colony, Natal, Zululand, Portuguese Territory, Rhodesia, and also the eastern part of the Transvaal. The winter is spent in the warm parts of the Portuguese Territory, Swaziland, Natal, and the bush land along the coast of Natal. But in October and November they begin to fly inland to the high veld. Just before egg laying, which is in November and December, they lose the reddish tinge of body and wings and become yellowish instead. The eggs begin to hatch about the middle of December or the 1st of January. By the 1st of March they have obtained wings and begin to return to the low veld. The voetgangers do not assemble into swarms like those of the brown locust, but remain scattered until nearly full grown; then they unite and move in swarms, consequently they are not so easy to combat as the brown voetgangers.

REMEDIES.

Many means have been recommended for the destruction of locusts, such as the pit and screen method, collection of eggs, and the collection and destruction of adults. These are valuable auxiliaries, but none of them have been found to be everywhere practicable in such a place as South Africa. It has become an axiom that the voetganger or hopper stage is the most susceptible to remedial measures, and experience in several parts of South Africa has shown that spraying is the most effective remedy. There are two substances which can be used for spraying: *Soap and arsenical solution.*

SOAP.

Any kind of soap will answer for the purpose. One pound should be dissolved in three to five gallons of water, and this solution sprayed with a bucket spray pump, directly on to the locusts, as it kills them by stopping up their breathing pores. Soap has been found very effective for very young voetgangers, but not when they are half grown or larger, owing to the difficulty in reaching and covering each individual with the solution.

### ARSENICAL SOLUTION.

The success obtained by the use of this solution in the Transvaal and Natal shows that it is the most effective means that can be employed. This solution is prepared as follows for young voetgangers :—

Arsenite of Soda ... 1 lb. (1 beef tin or 1 large cup full).  
Sugar ... .. 2 lbs. (2 " " 2 " " ).  
Water ... .. 16 gallons (4 paraffin tins full).

When the young voetgangers become half grown this solution should be prepared as follows:—

Arsenite of Soda . . . 1 lb. (1 beef tin or 1 large cup full).  
 Sugar . . . 1½ lbs. (1½ " " 1½ " " ).  
 Water . . . 12 gallons (3 paraffin tins full).

When the voetgangers are full grown the following solution can be used:—

|                  |     |   |
|------------------|-----|---|
| Arsenite of Soda | ... | 1 lb. (1 beef tin or 1 large cup full). |
| Sugar            | ... | 1 lb. (1 " " 1 " " -).                  |
| Water            | ... | 8 gallons (2 paraffin tins full).       |



*A solution stronger than one pound of arsenite to eight gallons of water should on no account be used.*

It should be sprayed lightly on the grass in a fine mist but not drenched. When voetgangers are small it can be sprayed among them or in a circle round them, but when they are larger and moving across the veld, a strip of grass in front of them should be sprayed. When they come to it they will commence eating, and in a few hours all will be dead.

*As arsenite of soda is a deadly poison, great care should be used in order to prevent accidents.*

Analysis has shown that 36 lbs. of grass, sprayed with the strongest solution recommended, will kill a young calf, and 72 lbs. an ox. Therefore all animals should be kept away from the sprayed areas until the arsenite has burned the grass, and caused it to die, or until a heavy rain has washed it off.

If these precautions are carried out no accidents need occur.

C. W. HOWARD,

Acting Chief, Inter-Colonial Locust Bureau.

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## Entomology.

With the increased interest taken in Arboriculture, the following Circular, drawn up by Mr. L. Peringuey, Director of the South African Museum, should prove an inducement to those persons interested in the subject to assist him in his research. The work will undoubtedly prove of great value to Horticulture and Arboriculture in this country.

All specimens forwarded should be addressed to The Director of the South African Museum, Cape Town.

## ENTOMOLOGICAL RESEARCH INTO INSECTS ABOUNDING IN SOUTH AFRICA.

### DIRECT DAMAGE TO FOREST TREES AND OTHERS.

Very little is known of the damage caused directly by insects in South African Forests, or agglomeration of trees dubbed as such. The object of this Circular is to call the attention of Forest Officers to the importance of

observations on the spot of *direct* or *indirect* damage done to indigenous trees—forest trees as well as under-wood, or even brushwood.

It is not possible for me to go and study on the spot the biological aspect of these enemies of trees; but many have nevertheless come under my observation.

What I really want is:

- (a) Observations of the life history of suspected noxious insects.
- (b) Specimen of the culprit to determine his status in the world of insects.
- (c) Samples of the damage done.

And when I explain that the object of my inquiries is for the benefit of the future officers of the department, to whom it is going to be part of my duty to teach the life-history of insects injurious to forest trees—in its widest sense—the Americans include shrubs in this class—I feel certain that the seniors will help me in a teaching which they themselves had perhaps no opportunity to obtain.

It is obvious that in a circular like this the seeker for information has to be as concise as he can possibly be, and the object of the present one is merely to direct the attention of the observer on very broad lines. My long experience of entomological work has taught me, however, that interest in the research grows, and that what may be looked upon at first as a toil becomes a scientific pursuit, and often in the end a scientific research.

It is even now a moot question if insects attacking Forest trees do so (a) when the tree is perfectly healthy, or (b) when the tree or the limb attacked shows already signs of decay.

Well, it is to those for whom this circular is intended that I look to for obtaining evidence of one kind or of the other. That there are insects that do injure fatally live trees, there is no doubt whatever. I have proved it. That there are others that may partially injure limbs of trees only, there is equal proof.

That there are others that attack felled trees only is now quite proven here. But we have to discover to which of these three categories injurious insects belong.

The number of insects *living on wood* is so very great, not only in kinds but also in examples, that I am quite sure that many of them will easily come under the ken of the Forest Officers.

The more destructive are those of the Beetle order. A Beetle is called a Beetle because it has four wings, the two upper ones of which are horny and hard, the other two being membraneous, and helping in the flight when these insects fly.

More conspicuous, because they are all comparatively large, and have very long antennae or feelers—often longer than the whole body—are the Longhorns or Cerambycidae.

Some are of a dun or light straw colour; others are again richly clothed in velvety bright bands, or clear stripes on a dark background. As far as it is known they are *all* living at the expense of wood. One may well imagine the damage done to the living trees, or to timber, by the larva or grub of a species varying in length from 2 to 6 inches, and wide in proportion. The Eastern part of the Colony, the Transvaal, Natal, are especially rich in these, and many of the grubs are fatal to the tree they attack. And while others attack only felled timber, the damage done by the latter is no less important, since the reputation of timber intended for certain cabinet or joiner's work will be injured by the damage done by insects in the logs or planks, as the seasoning of these proceeds.

It is most probable that the number of Longhorns attacking felled timber is greater than of the others attacking live ones. It is worthy of note that full-grown Longhorns are found in numbers where trees have been lately felled, and in or under the bark of which they set at once laying their eggs.

But more observations of this kind are wanted. The life-history, that is to say, the time elapsing from the time the egg is laid under the bark, and from which the grub issues, until it turns into the perfect beetle, is often extremely long. I know a case of nine years here for the so-called Spanish Fly. Cases of upwards of forty years are on record.

The Forester must, however, pay special attention to those Longhorns that cause the death or decay of living upstanding trees. The cultivation of coffee trees is seriously hampered in Eastern Africa through one of this group; another one does the same here in the case of orange trees.



## BORERS.

Just as dangerous to living trees, and prejudicial to felled timber are the Borers (*Bostrychidæ*). They are cylindrical insects, varying in length from one-eighth of an inch to a full inch. The female is often very different from the male. They are very widely spread in Africa and elsewhere.

Some, the larger ones, bore a cylindrical hole to penetrate into the bark or into the timber. Of course the bark or stem of the plant is then doomed. Others, again, bore in decaying trees, or at least are found there, the decay may be possibly due to their action at an earlier stage.

This applies to the *Scolytidæ* and *Platypidæ*, which are the destructors of trees *par excellence*. All small, they pass unnoticed, and yet the harm done by them to *live* trees is enormous. I had no hesitation in ascribing the death of huge orange trees to the small galleries bored right through the trunk by a minute Platypid called *Crossotarsus bohemani*. It seems now to be proved that most of the beetles of that group grow in their galleries a fungus, the mycelium of which has to be browsed by the grubs, and this readily enough for the animals not to be entombed in it. It is thus a secondary cause that brings down the fall of the tree.

## BUTTERFLIES.

Lepidoptera as direct enemies of the forest are not numerous. Yet there are a fair number of *Cassidæ* injurious to orchard trees and others, and in the very heart of a Mimosa tree trunk (*Acacia horrida*) I had sent me a huge caterpillar, the burrowing of which had certainly caused the tree to decay. *Leto venus*, the "Silver Moth," is reputed to attack in Knysna the Keurboom, but it attacks also possibly other kind of trees.

## INDIRECT DAMAGE.

The most serious damage done to a tree is, however, the one originating in the roots, and caused mostly by beetles. The perfect insect feeds only on leaves, but in the grub state it is known to be seriously injurious, for it has been ascertained that the growth of the concentric rings in those trees is greatly impaired; but observations

of this kind are very difficult. We have here no end of Scarabaeid Beetles feeding in this manner; their life in the larval stage is also very long. Similar root damage is probably the result of the work of Scolytidae. First it causes interruption of the flow of sap, and secondly, through admission of wet between the bark and the wood, decay speedily ensues—but the result is the same, whatever be the prevalent cause.

It is then to the Forest Officer that I look to observe the life history of the insects that attack the timber, of those that attack the leaves, and of those that attack the roots. Let them send me samples of the parts attacked, also of the insects attacking them. Sections of branches, stems, are specially desired. These samples, however, would be of general interest only unless accompanied by some observations.

I promise to keep the senders informed of the results of my investigations as they proceed, and I am quite certain that their labours in the direction of observing will prove to them a most agreeable enjoyment, and possibly to me the means of helping to keep in check, through their habits becoming known, certain insects dangerous to Forest development.

I may, however, warn these Forest Officers that it is to the indigenous trees mostly that their observations are to be directed, as the introduced timber and other trees, with perhaps the exception of the Pines, are, so far as I know, singularly free of indigenous insect pests, as yet.

(Sgd.) L. PERINGUEY.

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## **Some Veterinary Notes concerning Sheep.**

By L. E. W. BEVAN, M.R.C.V.S.

There are many indications that the breeding of sheep is destined to play a large part in the future of Rhodesia, and, indeed, the keen attention given to the matter during the past two years, and the rapid progress made in so short a period would justify the hope that the time is not far distant when Rhodesia will take her place in the markets of the world with a large supply of mutton, if not of wool.







Duplex Woven Wire Fence.

The question of wool production invariably gives rise to controversy generally of a pessimistic character, and for that reason will be neglected in the present article; but since the possibility of an improved and increased mutton supply is even now admitted as feasible and desirable, the present notes are penned in the hope that they may be of use to those who have started or contemplate starting, sheep-breeding in this country.

### PASTURE.

The present reduced price of mealies has caused many of those whose sole efforts have been to place their lands under cultivation for this crop to seriously consider how these lands may be profitably utilised for other purposes, and the idea of raising crops upon which sheep can be folded has occurred.

In reply to my enquiries concerning the sheep feeds which can be best grown in this country, Mr. Odum enumerates cow-peas, beggar-weed, mangel-wurzel, lucerne, rape, pumpkin, velvet-beans, and soja-beans as crops which have been grown in various neighbourhoods with results which merit further trials.

Again, the growing practice of mowing and hay-making is preparing the way for sheep rearing by improving the character of pasture, and rendering it more suitable and delectable to sheep, which, as is well known, feed best where the grass is short and sweet.

The cost of suitable mowing machines is not great, averaging between £20 and £30 in Salisbury, and obtainable on easy terms.

While on this subject, attention should be drawn to the very common error which is made in running sheep on veldt which is quite unsuited to them. It would be quite as reasonable to expect sheep to thrive on brick-bats as upon some of the pastures considered suitable for them by some breeders in the country. It should be recognised right away that the grazing ground must be selected: a flock will do far better on a few hundred acres of suitable veldt, than by grazing haphazard over thousands of morgen of indifferent pasture.

It is not desired to cast any reflections upon that useful and ornamental article—the herd-boy, but it is desirable that some little outlay should be made to secure

one good of his kind. Let it be borne in mind that in the old country the cost of repairing ditches, hedges, and fences upon an ordinary sheep farm, would cover the wage bill of a few hundred of these young men.

No doubt it will be beyond the power of most beginners to fence, but it is hoped that in the near future circumstances will bring this desirable, if not necessary, item within the bounds of possibility.

Dr. Stewart, the pioneer of fencing in the Salisbury district, has made great progress in fencing on his farm Twentydales, and his manager, Mr. G. Maclaurin, kindly furnishes me with particulars of the "Duplex woven wire fence machine," which weaves a fence admirably suited to sheep farms.

He writes: "The above machine can be obtained from the agents of the company, Messrs. D. E. Hockly and Co., East London, for £8, without carriage. As shewn by the photos, the machine can be worked by two intelligent boys, with the supervision of a white man. The poles in the fence shown are ten yards apart. The mesh horizontal can be made any size, from one inch to twelve inches, and also any number of horizontal wires can be used from five up to twelve. The cost of the fence shewn, for 100 yards, was £4 10s., and two boys can turn out 70 to 80 yards a day. The makers are Messrs. Kitzelman Bros., Muncie, Indiana, U.S.A."

A fair proportion of veld suitable for sheep exists on most farms in this country, but on nearly every property on which it is desired to run sheep, the natural grazing will have to be supplemented by food crops, and the pastures will have to be made. It may be added that in selecting grazing ground, in addition to the grasses, the question of shade and water must be borne in mind.

With a few experimental sheep which have been under observation with the view of ascertaining their natural habits in this country, it has been found a profitable proceeding to place a supply of pure water in a trough a short distance from the kraal. It has been noticed that the sheep seek the trough about nine in the morning, and after a short drink go off to graze until 11 a.m. They then return for a second drink, and remain lying in the shade of the trees, chewing the cud, until 2 or 3 in the afternoon, when once more they depart and remain grazing until nearly sun-down. On the way to the kraal they usually



stop and drink again. Thus is avoided the disadvantage of a long drive, and the danger of the animals drinking at filthy and polluted water holes and vleis, from which, as will be shewn later, verminous and other diseases are derived.

The custom of herding goats with sheep is not to be recommended, especially where there are a number of in-lamb ewes in the flock. Indeed, it would be wise to make a rule of having in-lamb ewes herded and kraaled by themselves. Many cases of abortion are attributable to injuries inflicted by goats or other sheep when the animals are penned up too closely, or are rushed helter-skelter into kraals through narrow gateways. Moreover, it must be remembered that veld most suited to goats is not the best for sheep, but that the goats in a mixed flock lead the way to pasture which suits them best.

#### BREEDING, GRADING, SELECTION, ETC.

This matter is of such importance that it cannot be adequately dealt with in these notes; there are certain features of the subject, however, which come within the scope of the present article.

It must be admitted that the present grade of sheep in the country is entirely unsatisfactory. The absence of any attempt at selection or breeding up, the neglect of the first rules of management, the ravages of innumerable diseases have contributed in producing the weedy specimens constituting the bulk of the flocks in the country. It is only during the past year that efforts have been made to improve the conditions of housing, herding, and grazing, and to arrive at some correct understanding as to the best time for lambs to be dropped, the most suitable ram to be placed to the ewes, and the many other features upon which the success of the industry depends. It should, therefore, be recognised as soon as possible that the greater number of local flocks are made up of ill-formed, carelessly bred, small-framed and shoulderless animals, whose weakly constitutions, inherited from weakly parents, predispose to disease, and cause them to hand on similar, or intensified, defects to their offsprings.

An immediate endeavour should be made to rectify this undesirable state of affairs, and success can only be

attained by starting on a sound and healthy basis. It would be better to sacrifice the weeds at a loss than to jeopardise the future of the flock by perpetuating their defects.

Moreover, it must be remembered that these diseased animals contaminate the pastures, and transmit their ailments to their fellows, and that so long as they remain it is a sheer waste of pains and money to add better and more valuable sheep to the flock. Sooner or later they too will share a similar fate. Continued in-and-in breeding, protracted close breeding, breeding from immature and enfeebled parents, disorders of the digestive organs, food deficient in quantity and quality, impure water, confinement in damp, dark, filthy and unventilated places, and many other influences which tend to lower the vital powers, must be guarded against, as their effects are not only immediate, but predispose to disease in future generations. It is only when a nucleus of ewes of good conformation and good constitution and good of their kind, has been obtained, and when suitable pastures have been prepared, that the question of breeding up can be considered; and it may be of interest to note that the writer has already been approached by intending importers of quality rams, with a view to ascertaining the number of flocks in the country suitable and qualified to receive these animals, with the view of grading up a more profitable stamp of sheep.

While on the subject of breeding, attention should be drawn to the pernicious system of allowing rams to run with ewes all the year round. It stands to reason that lambs dropped at unfavourable times of the year cannot thrive; nor can the ewes be expected to throw and nourish two lots of lambs in the year.

The general opinion appears to be that there are two best periods for lambing in this country, the first during the months of March and April, and the second during August and September. The latter period would most probably be proved the better, as then the grasses are more luxuriant and nutritious, and the mothers are better able to make milk for their young, and the lambs are weaned at a time when there is plenty of good rich feed for them.



"Grading-up."



An example of "Grading-up." Sheep in fore-ground, first-cross Persian Ram  
ex Native Ewe (Mashona).





## SHEEP-KRAALS, SHEDS AND HOUSES.

A not uncommon factor in the production of sheep disease in this country is the habit of penning up, at night, large numbers of sheep in small and badly ventilated huts or sheds.

The atmosphere in these places becomes vitiated to such an extent that, when the door is first opened in the morning, it is often impossible to enter. The floors of these huts become filthy and saturated with excreta of the animals, the walls are covered with their fæces and the discharges from the noses of the imprisoned victims.

It is not surprising that animals confined night after night in such death-traps become weak and debilitated, their lungs become susceptible to disease, the mucous membranes of the air passages become inflamed, and the well-known nasal discharge is the result; the feet become degenerated and liable to rot and injuries; the digestion becomes impaired, and the animals pick up the eggs of the many intestinal worms which undermine the constitution. Unfortunately, this description is not an exaggeration; such conditions have been met with throughout the length and breadth of the country.

From the point of view of immediate profit, such a state of affairs is to be deplored, for it is seldom that sheep can thrive or fatten under such conditions, and it is almost impossible for ewes to carry their lambs to full term; and if they do succeed in doing so, they bring forth undersized and deformed weaklings which can obtain little or no nourishment from their diseased and impoverished mothers.

It is pretty generally held that some form of shelter is necessary in this country, although there are some used to sheep breeding in other countries who deny it. Some sort of provision has generally to be made against wild carnivora, and when designing an enclosure, it might be well to add some form of shelter, for the majority of sheep in this country are accustomed to protection against the extreme cold of the night, which often follows an intense heat by day.

Mr. A. J. Maclaurin kindly furnishes me with the following specification and plan of a very suitable sheep-shed or "lean-to."

*Specification.*—Sheep shed and kraal to be built of brick, stone, galvanised iron, or poles, to the dimensions shown on plan and section. Walls of shed six feet high, with a three-foot air space between top of wall and roof. Roof to be constructed of thatch or iron, if the latter, wall-plates of 3 x 3, rafters  $4\frac{1}{2}$  x  $1\frac{1}{2}$ , purlins 3 x 2, studs from wall head to roof, 3 x 2. Native wood poles, well treated with carbolinum, will do for the posts in front of the shed.

The back wall of the shed should face the East or South-east.

All timbers before being fixed should be covered with a good coat of carbolinum.

The two rows of seven foot galvanised iron to be fixed to the three purlins with galvanised screws and washers. The rafters should not be placed more than six feet apart.

## VERMINOUS DISEASES.

The havoc wrought by verminous diseases among our sheep is little less than appalling. It would not be an exaggeration to say that there is scarcely a sheep in this country which does not harbour one or more species of worm more or less detrimental to its welfare.

The economic importance of this lies in the fact that by far the greatest number of deaths among sheep are either directly attributable to worms, or are indirectly caused by the debilitating influences they exert.

No good purpose would be served by classifying the hundred and one worms met with, or by enumerating the grandiloquent Latin names with which they are honoured; suffice it to say that tapeworms (platyhelminths) and wireworms (nematodes) are almost invariably found invading the gastro-intestinal canal of local sheep.

So favourable are the conditions of climate as regards temperature and moisture for the propagation of these pests, that when once they are introduced on a farm it is only with the greatest difficulty that they can be exterminated.

Some months back it was held that the much dreaded "fluke" did not exist in this country, and it was hoped that, should it be introduced, it would be quickly eliminated, because it was thought that the snail which acted as intermediary bearer was not present. These surmises proved incorrect, for a few animals having been



introduced from Bechuanaland and infected with "liver-rot," the disease spread with remarkable rapidity throughout the flock into which these imported animals were introduced. Within a very short time there was scarcely a sheep, goat, lamb or kid in the flock which was free from the parasite. The noxious action produced by worms depends partly upon the numbers present, and partly upon the species to which they belong. Some cause ill effects by the disturbance to digestion and assimilation which they set up, others by the amount of nourishment and blood which they extract from their hosts; others again by their entrance into organs whose functions they derange. An example of the latter is met with in the tape worm, so frequently found in this country invading the bile ducts of the liver, and producing symptoms almost identical with those caused by "fluke."

*Symptoms.*—The principal symptoms produced by the worms are those of emaciation and anæmia. Pallor of the mucous membranes and of the skin (at those parts where it is not covered by wool or hair) is seen. The coat or fleece becomes coarse, dry, broken and invaded by parasites, and stands out straight along the back. The animal becomes weak, languid, emaciated, and carries its head low: when caught and held by the hind leg, its efforts to release itself are made without vigour, and soon cease.

One of the earliest marked symptoms is œdema of the throat, characterised by the well-known sac or swelling under the lower jaw, sometimes called "bottled-jaw," "water-sac," or "poverty sac."

The sheep becomes "razor-backed" and "pot-bellied," with large hollows at the flanks, and so low in condition that it is particularly liable to other complaints. It frequently happens that the inexperienced observer, on making a post-mortem examination, neglects to examine the contents of the bowels, and is at a loss to account for the alterations met with in other parts of the body. The following description of the usual lesions met with may assist in arriving at a correct diagnosis:

When the skin is removed, the cellular tissues all over the body are filled with a clear, watery fluid, especially in the space between the jaws and around the brisket. On opening the abdominal cavity, a quantity of pale watery fluid is seen.

The blood is watery, and hardly leaves a stain on the hands: the small bowels are pale and almost transparent. Very little fat is present, and what there is is watery and waxy in appearance.

On opening the thoracic cavity the heart is found pale in colour, and often floating in a quantity of fluid which occupies the heart sac. This last condition has often led to the diagnosis of "heart-water" by those who are not aware of the fact that in that disease the straw-coloured fluid in the heart sac differs in that it coagulates into a firm jelly when withdrawn from the body or exposed to the atmosphere. The lungs are usually paler in colour than normal, and the thoracic cavity itself frequently contains a clear watery fluid.

*Preventive Measures.*—In devising a scheme for the prevention or eradication of worms in a flock, it must be borne in mind that the particular worms under consideration give rise to vast numbers of eggs, which, passing out with the fæces of affected animals, are spread broadcast, and being very resistant, are capable of weathering adverse circumstances until conditions favourable to the completion of their life cycle are met with. In the case of the wire worms, the eggs, or the embryos developed within them, are capable of existing for long periods in dirty or muddy water, in which they are taken up by the sheep in grazing or drinking, thus completing their cycle of development. The eggs of tapeworms, however, have to find their way into a second host wherein their intermediary stages are passed. An interesting example of this is met with in the tapeworm of the dog (*D. caninum*), whose cystic stage has been found in the dog flea, which in turn is devoured by the dog in whose body the various stages of its development are completed.

The last example is given because it is noticed that sheep which are badly infested by external parasites, such as fleas, lice and ticks, are generally also invaded by worms, and this being so, the advisability of dipping or otherwise treating such animals suggests itself.

Although at present we are only discussing the parasites which invade the intestines in their sexually mature form, it must be remembered that sheep also harbour other worms in their intermediary stages. An example of this is the so-called sturdy or "mal-kop," in which disease the peculiar symptoms are produced by the pre-



Lambs born in and out of season. Numbers 1 and 2 were born in November, number 3 was born in March, and weighs more than either.



A "Lean-to" for Sheep.





sence in the brain cavity of a bladder-like body which is the cystic stage of a tapeworm (*tænia Coenurus*) which lives, in its adult stages, in the intestines of the dog.

Upon these considerations, the following suggestions are based, and if they appear extreme, the situation does not justify half measures:

1st. Where it can be taken that the veld is clean, steps must be taken to prevent any possible means of contamination.

Newly purchased sheep must be regarded as infected, and should be isolated in an "arrival camp," and dosed against worms, and should not be allowed on the pastures until they can confidently be regarded as safe.

Even sheep considered clean should be periodically dosed.

2nd. Where it is known that the pastures are not clean, the following steps should be taken:

- (a) Attend to swamps, vleis and water-holes, and drain off the stagnant surface water from those pastures upon which the sheep have been running, for it is in these situations that worms find the conditions most suitable for their existence.
- (b) Remove the sheep to an isolation camp or hospital, dose them carefully, and when they can be reasonably regarded as clean, remove them to new and higher veld.
- (c) Burn the droppings of the animals under treatment, for these contain the eggs or embryos of the worms which, being very resistant, are capable of existing for long periods until opportunity for the completion of the life history of the parasite may occur.
- (d) Clean out the old kraal, burn the dirt from the ground, and thoroughly cleanse and disinfect the whole by means of a spray pump and strong disinfectant.
- (e) Since the external parasites of the sheep may act as hosts to the worms in their intermediary stages, the sheep should be dipped regularly or otherwise treated with parasiticides.

- (f) Where sheep are so badly affected that curative means are of no avail, they should be destroyed. Such drastic measures will prove cheapest in the end.
- (g) Dogs act as host to some of the worms which pass their intermediary stages in sheep, and should, from time to time, receive vermicides and purgative medicines.

*Treatment.*—It is greatly to be regretted that the administration of fluid medicines to sheep and goats is so frequently followed by untoward results, for many agents which are held to be specifics against worms cannot be recommended on account of the disasters which follow their misuse.

It is such a common thing to hear of animals being killed by the pouring of fluid medicines "down the wrong way," or by the administration of powerful agents in too strong solution, that it would be best, perhaps, to avoid mention of drugs which might be wrongly applied.

The present article would, however, be considered incomplete by many if reference were not made to Blue-stone, which is such a popular remedy for verminous diseases in herbivora.

In using this drug, the greatest care should be exercised, first as to the method of dosing, and second as to the strength of the solution; for if the solution of sulphate of copper is too strong, it is apt to cause inflammation of the lining of the stomach and intestines. Although it is an effective remedy for tapeworms in lambs and kids, "it requires to be very carefully administered to these small animals, because if any of it passes down the windpipe into the lungs, it is almost certain to produce inflammation of these organs." Even in dosing sheep and goats with this agent, the greatest care must be exercised for the same reason.

It must also be remembered that the drug must be well diluted, for "when the sulphate of copper solution is reduced in strength, a full dose can be given with less danger of causing inflammation; and when there is a large quantity of solution, a sufficient amount to kill the tapeworms is more likely to reach the small intestines, where these worms are situated, than when a more concentrated solution is given."



The following quantities and solution of bluestone will be found effective if carefully administered :

Take—One pound of Copper Sulphate of best quality, and dissolve completely in 10 gallons of warm water.

Dose : One tablespoonful of this mixture may be given to a lamb up to the age of three months.

Two tablespoonfuls to a lamb between three and twelve months.

One wineglassful ( $2\frac{1}{2}$  ounces) to a goat or sheep between twelve and eighteen months.

Two wineglassfuls (5 ounces) to a full-grown sheep or goat.

The animals to be treated should be starved for twenty-four hours before the mixture is given, and should be kept away from water during the day that they are dosed.

#### METHOD OF ADMINISTERING A FLUID MEDICINE.

The sheep should be held upon its haunches, and no attempt should be made to offer the drench while the animal is struggling. The person administering should hold the head steady with his left hand, not grasping the throat or holding the tongue or in any way interfering with the act of breathing or swallowing. The medicine should be placed in a bottle having no shoulder, but with a thin neck, or having a piece of rubber tubing attached to the neck. The bottle should be held in the right hand while the sheep is persuaded to open its mouth by placing a finger of the left hand on the floor of the mouth. The neck or tube of the bottle should be placed upon the tongue, and the bottle so inclined that the contents pass slowly out just so fast as the animal is able to swallow with comfort.

Avoid haste, do not grasp the tongue, do not hold the sheep's head up straight in the air, do not force the mouth open, or pour the medicine too quickly into the mouth, do not attempt to pour the medicine into the mouth while the animal is struggling or bleating.

As has been said before, the fatalities arising from the misuse of this agent have been so numerous that it has been thought advisable to cease to recommend it; the following system, a slight modification of an old treatment for worms, has been tried in this country with the most satisfactory results.

*The Dry Method.*—This name is given to the process because no fluids are used, and thus the danger attending the methods of drenching are avoided.

First, as applied to animals newly arriving on the farm. These animals should not be allowed to run at once on the pastures, but should be confined in an isolation camp for a fortnight, during which they should receive on every third day a teaspoonful of the following powder :

Cooper's Dipping Powder : 1 oz.

Finely powdered common salt : 1 lb.

In preparing this powder, first thoroughly pulverise the Cooper's Dipping Powder, and pass through a sieve to be sure that no lumps remain, and then mix completely and uniformly with the salt.

Dose : A level teaspoonful of the mixture should be placed in the mouth of a full-grown sheep, a half teaspoonful only should be given to a lamb.

To administer the powder the sheep should be held as shown in the photograph, while the operator, opening the mouth with one hand, inserts the spoon with the other, and inverts it so that the powder is placed upon the back of the tongue. By using the gag shown in the diagram, the tongue can be depressed and the spoon passed through the opening, thus little of the powder is spilt or wasted. If the dose is administered to animals on the day they arrive, a second dose should be given on the fourth day, and further doses on the seventh, tenth, and thirteenth days. No food or water should be given after the last dose until the fourteenth day, when it is advisable to administer a dose of the following powder :

Calomel : 4 ozs.

Powdered Ginger : 12 ozs.

The above to be mixed thoroughly.

Dose : A full-grown sheep should receive a teaspoonful of the powder.

A lamb half a teaspoonful, or less, according to size.

Twenty-four hours after, the animals may be released and allowed to run on the pasture selected for them.

The same process may be applied to flocks known to be infected with worms, these animals being taken into a hospital camp and dosed in the above manner, but not allowed to graze on the infected pastures during the process nor to return to them when released.



Typical Wormy Sheep.



Use of Gag in Drenching Sheep.





As a preventive, a lick should be always available, and might be conveniently placed by the water trough.

A very useful lick is:

Cooper's Dipping Powder: 1 part.

Slaked Lime: 3 parts.

Common Salt: 30 parts.

Thoroughly powdered and mixed.

*(To be continued.)*

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### **Experiments in connection with so-called "Three-day Sickness" or "Stiff-Sickness."**

By L. E. W. BEVAN, M.R.C.V.S.

Having conducted experiments in connection with the so-called "Three-Day Sickness," I have drawn the following conclusions from the results obtained:—

1. That cattle may suffer from the disease without showing any stiffness or clinical symptoms other than high temperature and the usual symptoms of fever.
2. That cattle may die from the disease, having shown typical symptoms during life, and no lesions be met with on *post-mortem*, save cerebral congestion and effusion into the heart sac.
3. That the blood of an ox suffering from the disease when inoculated into a sheep produces a typical febrile re-action between the sixth and tenth days.
4. That such febrile re-action is not accompanied by stiffness or lameness.
5. That a sheep having re-acted to such an inoculation will not re-act to a second injection of virulent blood, although the same may be taken from another ox sick of the disease.
6. That a temperature re-action, resembling in all respects that obtained by inoculation of virulent blood, may be obtained by inoculating a sheep subcutaneously with an emulsion of spinal cord taken from an ox which has died of so-called "Stiff-Sickness."

Cattle Inspectors Tully and Morris have reported to me cases of undoubted "Stiff-Sickness" occurring natur-

ally in sheep, and I have examined two sheep apparently affected with a severe cerebral form of the disease.

It may be mentioned that in no instance have any inoculation results been complicated by abscess formation, and that the preliminary elevation of temperature noticeable from the charts is generally met with in sheep which have received quantities of foreign blood.

#### CASE I.

*Persian Merino Ewe.*—Inoculated on March 28th with 5 c.c. citrated blood from Mr. Arnott's ox suffering from typical symptoms of "Three-Day Sickness," and having a temperature of 106·8 when blood was taken. This blood sent to Grahamstown Veterinary Laboratory, was inoculated by Mr. W. Robertson, M.R.C.V.S., into an ox and produced a temperature re-action and marked stiffness of the limbs. The ewe was inoculated subcutaneously in the groin. After a preliminary elevation and fall of temperature, a specific temperature wave occurred between the eighth and fifteenth days.

The temperature chart read as follows:—

| 1907.         | M.    | E.    | 1907.        | M.    | E.    |
|---------------|-------|-------|--------------|-------|-------|
| March 28th... | 100   | ...   | April 5th... | 101   |       |
| " 29th...     | 100   | ...   | " "...       |       | 102·4 |
| " 30th...     | 100·2 | 103   | " 6th...     | 102·2 | 103·4 |
| " 31st...     | 102   | 103·4 | " 7th...     | 102·8 | 105   |
|               |       |       | " 8th...     | 103·6 | 105·2 |
|               |       |       | " 9th...     | 104·6 | 105   |
| April 1st...  | 102   | 103   | " 10th...    | 103   | 104   |
| " 2nd...      | 101·4 | 102·4 | " 11th...    | 102   | 103   |
| " 3rd...      | 101   | 102   | " 12th...    | 101   | 102   |
| " 4th...      | 101   | 102   | " 13th...    | 100·8 | 102   |

} Temperature re-action.

#### CASE II.

*Persian Merino Ewe.*—This ewe was used in the previous case, and re-acted to subcutaneous inoculation of blood from Mr. Arnott's ox typically affected with "Stiff-Sickness." Inoculated April 23rd, receiving 10 c.c. blood subcutaneously. This blood was taken from Mr. MacArthur's cow "Daisy," which, although showing no stiffness, was undoubtedly suffering from the disease. Her temperature at the time the blood was taken was 106° F. Her eyes were swollen, her milk had ceased, and a jugular pulse was well marked.



Sheep No. 3 (Case 3) was used as a control.

Temperature charts attached will show that the blood was virulent, causing a re-action in a sheep not inoculated hitherto but failing to produce a re-action in Case 2, which had previously re-acted as described under Case 1.

Temperature Chart:—

| 1907.          | M.    | E.    | 1907.       | M.                     | E.  |
|----------------|-------|-------|-------------|------------------------|-----|
| April 23rd ... | 102   | ...   | May 1st ... | 101                    | 102 |
| " 24th ...     | 103   | 104   | " 2nd ...   | 100                    |     |
| " 25th ...     | 102·4 | 103·4 | " " ...     | } continued<br>normal. |     |
| " 26th ...     | 102·4 | 103   | " 3rd ...   |                        |     |
| " 27th ...     | 102   | 102·4 | " 4th ...   |                        |     |
| " 28th ...     | 101·2 | 102   | " 5th ...   |                        |     |
| " 29th ...     | 101   | 102·4 |             |                        |     |
| " 30th ...     | 101·4 | 102·2 |             |                        |     |

The results obtained would indicate that an attack of the disease confers immunity, and that a means of immunising might be found by working along these lines.

### CASE III.

*Persian Merino Ewe.*—This animal was used as a control to Case 2, and was inoculated subcutaneously with 10 c.c. of blood taken from Mr. MacArthur's cow "Daisy" (as in case 2).

Temperature chart following will show a short usual elevation followed by a specific elevation commencing on the sixth day.

The result served to prove that the blood used in Case 2 was virulent.

Temperature Chart:—

| 1907.          | M.    | E.    | 1907.       | M.                     | E.    |
|----------------|-------|-------|-------------|------------------------|-------|
| April 23rd ... | 101   | ...   | May 1st ... | 102                    | 103·4 |
| " 24th ...     | 102   | 103   | " 2nd ...   | 101                    |       |
| " 25th ...     | 101   | 103·3 | " " ...     | } continued<br>normal. |       |
| " 26th ...     | 101·4 | 103   | " 3rd ...   |                        |       |
| " 27th ...     | 101·4 | 103·4 | " 4th ...   |                        |       |
| " 28th ...     | 101·4 | 104   | " 5th ...   |                        |       |
| " 29th ...     | 103   | 105·6 | " 6th ...   |                        |       |
| " 30th ...     | 104   | 106   | " 7th ...   |                        |       |
|                |       |       | " 8th ...   |                        |       |

## CASE IV.

*Persian Merino Ewe* (not previously inoculated).—This ewe received 10 c.c emulsion of spinal cord taken from Mr. Krienke's cow which died on April 22nd. Emulsion was injected subcutaneously in the groin. After a preliminary and usual elevation a specific temperature wave commenced on the sixth day. The results obtained indicate that the infective material is present in the spinal cord.

Temperature Chart:—

| 1907. |          | M.    | E.    | 1907. |         | M.                   | E.  |
|-------|----------|-------|-------|-------|---------|----------------------|-----|
| April | 23rd ... | 102   | ...   | May   | 1st ... | 103                  | 103 |
| "     | 24th ... | 103   | 104   | "     | 2nd ... | 101·5                | 101 |
| "     | 25th ... | 101·2 | 103·4 | "     | 3rd ... | continued<br>normal. |     |
| "     | 26th ... | 102   | 103   | "     | 4th ... |                      |     |
| "     | 27th ... | 101·2 | 103   | "     | 5th ... |                      |     |
| "     | 28th ... | 102·4 | 103·6 | "     | 6th ... |                      |     |
| "     | 29th ... | 103   | 105   | "     | 7th ... |                      |     |
| "     | 30th ... | 104·6 | 105·8 | "     | 8th ... |                      |     |
|       |          |       |       | "     | 9th ... |                      |     |

NOTE.—The cow from which the cord was taken had been sick for three days. On the first day stiffness had been manifest, but had passed away, and vertigo had set in. *Post-mortem* symptoms were almost confined to the brain and spinal cord, which were congested. Between the convolutions of the cerebrum the covering membrane was elevated, and beneath it could be seen a watery gaseous fluid, recalling the condition met with in emphysema of the lungs.

The heart sac contained blood-stained fluid, but the blood was not altered in regard to its powers of clotting as in previous cases.

The lungs were apparently normal, as were the abdominal viscera.

The fat was not discoloured.

This was practically a case where symptoms could be attributed to alterations of the brain and spinal cord, and serves to prove the correctness of the suspicion that the primary lesions of the disease are in the nervous system.

## Epitome of Cattle Inspectors' Returns.

MARCH, 1907.

### SALISBURY.

*African Coast Fever.*

Fresh Outbreaks: None.

Existing Outbreaks: No deaths.

*Horse Sickness.*

The Township has been very free of this disease, but a number of cases have been reported between Salisbury and Abercorn.

### BULAWAYO.

*African Coast Fever.*

Fresh Outbreaks: None.

Existing Outbreaks: No deaths.

*Rabies.*

One suspected case occurred in the Township. A dog was destroyed at Filabusi Siding.

*Glanders.*

The following animals were tested with Mallein and found healthy:—

|               |    |
|---------------|----|
| Horses ... .. | 26 |
| Mules ... ..  | 51 |

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### UMTALI.

*African Coast Fever.*

Fresh Outbreaks: None.

Existing Outbreaks: No deaths.

*Horse Sickness.*

Losses have been exceptionally severe, 10 horses and 4 mules having died.

*Scab.*

No fresh outbreaks.

Eleven flocks remain under licence.



## GWELO.

### *Foot-Rot.*

A rather severe outbreak of this disease has broken out amongst a large number of transport donkeys.

## VICTORIA.

### *African Coast Fever.*

Fresh Outbreaks: None.

Existing Outbreaks: 39 deaths have occurred.

The movement of the animals through the temperature camps has been proceeding, the cordon of police being still maintained.

## MELSETTER.

### *African Coast Fever.*

Fresh Outbreaks: None.

Existing Outbreaks: One death occurred on the farm "Nooitgedacht." The cattle on the other infected areas remain healthy.

### *General.*

Stiffsickness has appeared in the Makoni and Umtali Districts and is now prevalent throughout most of the Native Districts in Southern Rhodesia. Investigations as to the cause are still in progress.

Number of deaths African Coast Fever ... 40

Number of cases of Rabies reported ... 2

E. M. JARVIS,

Acting Chief Veterinary Surgeon.

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APRIL, 1907.

## SALISBURY.

### *African Coast Fever.*

Fresh Outbreaks: None.

Existing Outbreaks: No deaths.

*Horse Sickness.*

A large number of horses and mules have succumbed to this disease.

BULAWAYO.

*African Coast Fever.*

Fresh Outbreaks: None.

Existing Outbreaks: No deaths.

*Horse Sickness.*

Only one area now remains under quarantine. This disease has been worse this year than it has for many years past, a very large number of horses and uninoculated mules have died from it.

*Glanders.*

The following animals were tested with Mallein and found healthy: Horses, 4; mules, 12; donkeys, 43; total, 61.

UMTALI.

*African Coast Fever.*

Fresh Outbreaks: None.

Existing Outbreaks: No deaths.

*Rabies.*

One suspected case occurred in the township.

*Scab.*

One fresh outbreak, making twelve flocks, now under licence.

*Horse Sickness.*

Four horses and two inoculated mules died.

GWELO.

*African Coast Fever*

Fresh Outbreaks: None.

Existing Outbreaks: No deaths.

*Rabies.*

One case in the township.

## VICTORIA.

### *African Coast Fever.*

Fresh Outbreaks: None.

Existing Outbreaks: Owing to the mortality during March, it was decided to again remove the cattle on No. 4 Camp to clean veld, passing them through temperature camps. Only one death has occurred.

### *Rabies.*

Two cases occurred, one at Victoria and one at Chibi.

## ENKELDOORN.

### *Lungsickness (Sheep and Goats).*

This disease broke out amongst two flocks, and 47 deaths occurred. Temperatures were taken, and all under 103'5 that were free from clinical symptoms were removed to new kraals and pasturages, since when no deaths have occurred.

### *Horsesickness.*

Three horses and two inoculated mules died.

## MELSETTER.

### *African Coast Fever.*

Fresh Outbreaks: None.

Existing Outbreaks: No deaths.

E. M. JARVIS,

Acting Chief Veterinary Surgeon.

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## **Report on Native Rubber.**

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By Professor WYNDHAM R. DUNSTAN, M.A., F.R.S.,  
Director, Imperial Institute.

"This sample of rubber-like material was forwarded for examination to the Imperial Institute by the Assistant Secretary of the British South Africa Company, with letter dated 10th May, 1906. It was stated that the material had been received from the Agricultural Department at Salisbury, Southern Rhodesia, but no information was supplied regarding its botanical origin."



## DESCRIPTION OF THE SAMPLE.

The material was in the form of a thick cake which weighed 42 grams. It was black externally and dark grey within, but the freshly-cut surface soon blackened on exposure to air. It had a disagreeable odour and contained a considerable quantity of impurity in the form of grain husks. Its physical characters showed little resemblance to true rubber, as it was sticky and exhibited little elasticity or tenacity.

## RESULTS OF EXAMINATION.

The material was analysed in the Scientific and Technical Department of the Imperial Institute, and furnished the following percentage results:—

|                          | Material<br>as received. | Calculated<br>for dry material. |
|--------------------------|--------------------------|---------------------------------|
| Moisture ... ..          | 34.6                     | —                               |
| Resin ... ..             | 36.7                     | 56.1                            |
| “Caoutchouc” ... ..      | 21.0                     | 32.1                            |
| Albuminoid Matter ...    | 1.6                      | 2.4                             |
| Insoluble impurity... .. | 6.1                      | 9.3                             |
| Ash ... ..               | 4.62                     | 7.06                            |

It will be seen from these figures that the material is of a very resinous character, over 56 per cent. of resin being present in the dry material. The amounts of insoluble impurity and of ash are also high. On the other hand the percentage of “Caoutchouc” in the dry material only reaches 32, and the substance returned under this head was of a very inferior quality exhibiting little elasticity or tenacity. It was in fact unlike true rubber either in appearance or properties.

## CONCLUSIONS.

It is evident from these results that this product from Southern Rhodesia is of a very inferior quality and that it would not be suitable for technical use as rubber. It might be possible to utilise it for certain purposes for which pontianac, almeidina and other similar products are now employed, but it would only fetch a very low price in the market, and it is doubtful whether its collection in Southern Rhodesia would prove remunerative.

It is desirable that the botanical name of the plant which yields this product should be put on record, and, if this is at present unknown, botanical specimens should be forwarded for identification.

This sample of so-called "gutta percha" was forwarded for examination to the Imperial Institute by the Secretary of the British South Africa Company with a letter dated the 23rd August, 1906, which enclosed a copy of a communication from the collector of the material at Lomagundi, Southern Rhodesia.

The sample, which weighed 22·5 grams, consisted of a cream-coloured substance, which was very friable and evidently of a resinous nature. It became soft and plastic on immersion in hot water, but hardened again on cooling.

The sample was too small for complete chemical examination, but the following determination was made:—

|                                 | Sample<br>as received. | Calculated<br>for dry material. |
|---------------------------------|------------------------|---------------------------------|
| Moisture, per cent. ...         | 37·5                   | —                               |
| Resin, per cent. ...            | 44·6                   | 71·4                            |
| Insoluble matter, per cent. ... | 3·5                    | 5·6                             |
| Ash, per cent. ...              | 3·0                    | 4·8                             |

These results show that the material is of a very resinous character. It was found to contain no gutta, the characteristic constituent of gutta percha, but a small amount of inferior rubber-like substance was present.

The material therefore resembles the Almeidina of commerce and could possibly be utilised for the same purpose. It would be quite useless as a substitute for gutta-percha.

A much larger sample would be required for commercial valuation, but it may be stated that the present value of Almeidina is about 50s. per cwt. in London, and this product from Southern Rhodesia would not realise more than this price.

No information was supplied regarding the botanical source of this material, but, like Almeidina, it may be derived from a euphorbiaceous tree.

This sample was collected by Mr. R. Wight, Ayrshire Mine, Lomagundi.

## Rhodesian Wool.

At the Wool Exchange, London, on Thursday, March 14th, 1907, the following bales of wool from the Rhodes Inyanga Farm were sold by Messrs. Windeler and Company, at prices ranging from 9d. to 1/6½ a pound:—

|                     |        | Rhodesian Wool. |         |
|---------------------|--------|-----------------|---------|
|                     |        | Bales.          | per lb. |
| Scoured 1st Combing | ... .. | 6               | 1/6½    |
| „ 2nd „             | ... .. | 3               | 1/5½    |
| „ „ „               | ... .. | 1               | —       |
| „ 19, pt. Combing   | ... .. | 2               | 1/0½    |
| „ Bellies           | ... .. | 1               | 1/3½    |
| „ Locks             | ... .. | 3               | —       |
| Greasy 1st Combing  | ... .. | 4               | 10d.    |
| „ 2nd „             | ... .. | 3               | 9d.     |

All this Rhodesian Wool went to home buyers. Messrs. Kelsall and Kemp, of Rochdale, Flannel Workers, bought the “scoureds,” and Messrs. Richard Moore and Son, of Bradford, Combers, bought the “greasy.”

## Introduction of Bullock Hides from Rhodesia into the Cape Colony.

Ox hides from slaughter bullocks may be consigned from Rhodesia to the Cape Colony, provided:—

- (a) Dry hides, skins, and horns are accompanied by a certificate to the effect that they have been properly cured and dressed, and are free from ticks.
- (b) Green hides, skins, and horns are accompanied by a certificate to the effect that they have recently been properly disinfected in a 5 per cent. solution of Izal, Lysol, Jeyes Fluid, Carbolic Acid, or any of the Standard Sheep Dips of full strength, and are free from ticks.

These certificates to be under the hand of the Principal Veterinary Surgeon of Rhodesia or his authorised deputy.

Bullock hides may be railed through the Bechuanaland Protectorate on production of the Resident Commissioner's permit, which is granted on a veterinary certificate that hides are disinfected or so treated as to render it practically impossible for them to convey ticks.



## Correspondence.

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TO THE EDITOR, "AGRICULTURAL JOURNAL."

SIR,—

Referring to the Poultry Notes in the April Journal, it may perhaps interest some of your readers to know that about four years ago I sent to a leading Agricultural and Poultry Journal in England samples of all the native grains, asking them which they recommended as the best general food for laying hens. They replied that they considered Rapoko to be the most suitable. Of course, it would not be understood that rapoko by itself would be such a well balanced feed as the combination you suggest, but if a few varieties of grain only are to be fed, it was meant that rapoko should be more or less the staple food. I notice that you recommend green bone in your notes, but suppose a man has three to four hundred fowls, where is he to get the green bone, unless he is fortunate in having a large herd of cattle, and unless, fortunate for the fowls, but unfortunate for himself—some disease kindly kills off the quantity required, with due regularity. The butchers in this country charge about as much for bone as they do for meat, and I consider that the cost of the green bone, if bought, would eat away the profit of the eggs.

Before I came to this farm I was on a sand veld farm, and as I had kept fowls as a hobby in England, and had studied them considerably, I went in for them on a fairly large scale, but I had soon had enough of it. I started with about 80 laying hens, which I put in two huts—40 in each, with a piccanin to look after them, and in the first year I reared about 300 chickens, which were kept away by themselves. The huts were lime washed out, and also the laying boxes, and done regularly once a month. Carbolic powder was sprinkled on the floors, and permanganate of potash put in their drinking water. I tried feeding on grain and also on soft food, and when they were fed on grain it was covered over so that they had to scratch for it. I even got oats and wheat from Natal—oyster shell grit and flint grit. I tried, as I say, feeding them, and I tried not feeding them. They were also regularly given green food such as lettuce, and also had green bones when

available. In fact, everything that theory and practice could suggest was done for their welfare, but very few eggs were the result. These fowls came up from Natal, and some that came up with them,—I think about a further 80—were put on red soil near Salisbury. Now the latter laid well when mine were not laying at all, or very little, and it appears to me from that experience, and from what I have noticed since, that fowls do not lay well on sand veld, but if the same fowls are removed to red soil, especially on kopjes, they will at once start to lay. I put it down to two reasons—firstly, that there are more insects on red veld, and secondly, that the grit they pick up on red veld contains a good deal of iron, which acts as a stimulant to the egg organs. I have also noticed that fowls removed from red soil to sand veld, will lay as before for about a month, when they go off, and I conclude the iron is then eliminated from their system. I think it would be interesting if others who have kept, or are keeping their fowls on sand veld, would give their experience.

Yours faithfully,

C. L. TYLECOTE.

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## Government Notices.

No. 42 of 1907.

Department of Agriculture,

Administrator's Office,

Salisbury, 28th February, 1907.

### RABIES.

**U**NDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby declare and make known that, on and after the 15th day of March, 1907, all and singular the Government Notices regarding the disease of Rabies now subsisting and in force in this Territory are hereby cancelled and repealed, except as to acts done or penalties incurred at the date of the coming into force of this Notice, and except as to officers appointed under Government Notice No. 286 of 1906, whose appointments shall remain valid for the purposes of this Notice, and in lieu thereof the following regulations shall have full force and effect:—

1. All and several the various Native Districts of Southern Rhodesia are hereby declared to be areas infected with the disease of Rabies.

2. Subject to any penalty a dog owner may have incurred under Government Notice No. 285 of 1906 by not registering his dog before the 1st day of February, 1907, the owner of any unregistered dog liable to registration may register the same at any time after the said date.

3. On and after the date of this Notice becoming operative the owner of every dog arriving at the age of three months, and the owner of every dog imported into Southern Rhodesia after that date shall register such dog with an official appointed for the purpose, provided that this provision shall not apply to any Municipality, Township or similar area in which provision for registration exists and is duly enforced.

4. A registration badge shall be issued for each and every dog registered, and the said badge must be attached to a proper and sufficient collar to be supplied by the owner, which must be placed and kept on each dog registered.

5. A fee to cover the cost of registration and supply of the badge in the amount of sixpence will become demandable and payable on registration of each dog.

6. Any dog found at large after the date of this Notice becoming operative, not having and bearing a registration badge duly issued by an official or the local authority, may be summarily destroyed by any person.

7. Every dog shall be kept muzzled with a standard wire muzzle made according to the pattern lodged with each Magistrate and Assistant Magistrate, and open to inspection on application to him, or with a muzzle sufficient to prevent its biting or injuring any person or other animal with its teeth, or shall be secured in an enclosure or by chain in such a manner that it shall not have access to persons or animals nor other animals access to it.

8. Every dog found at large after the 15th day of March, 1907, not being sufficiently muzzled, may be summarily destroyed by any person, and the owner or person responsible for the custody of such dog shall be liable to the penalty hereinafter prescribed.

9. Any Magistrate, Police Officer, Native Commissioner, Government Veterinary Surgeon or other official vested with the performance of functions under the Animals Diseases Consolidation Ordinance, 1904," may, on it appearing to him that any dog or other animal is showing symptoms which justify investigation as to whether such dog or animal is suffering from rabies or not, order the proper detention, isolation and control of such dog or animal either in the hands of the owner or at some other suitable place.

10. Should any dog show symptoms which lead to the suspicion that such dog may be suffering from rabies, the owner thereof shall forthwith notify the fact to the nearest official vested with powers under these regulations, who shall immediately report same to the Chief Veterinary Surgeon, and shall either destroy the said dog or isolate and secure it for further observation.

11. On its appearing that any animal is actually suffering from rabies, any of the above-mentioned officials may order the destruction of such animal, or may himself destroy it and may further take control of or destroy, if deemed necessary, any animal which has been in contact with a rabid animal or an animal suspected of being rabid.

12. The carcases of all animals destroyed on account of their being infected with rabies shall be thoroughly burnt by the person or official destroying them, save that such parts as may be required for scientific investigation may be retained under proper precautions. In any case in which a human being has been bitten by a rabid animal, the head of such animal shall, if possible, be taken and sent to the nearest Veterinary Official.

13. Any person contravening any of the above regulations or failing to carry out any of the provisions thereof shall be liable on conviction to a fine not exceeding £10 for each offence or in default of payment to imprisonment with or without hard labour for a period not exceeding one month.

No. 91 of 1907.

#### "GAME LAW CONSOLIDATION ORDINANCE, 1906."

UNDER and by virtue of the powers conferred on me by the "Game Law Consolidation Ordinance, 1906," I do hereby declare that the following Locust Birds:—

- (1) Great Locust Bird or White Stork (*Ciconia alba*).
- (2) Lesser Locust Bird or Nordmann's Pratincole (*Glareola melanoptera*).
- (3) Small White Heron or Cattle Egret (*Bubulcus ibis*).
- (4) Wattled Starling (*Dilophus carunculatus*).

are added to Class "A" of the said Ordinance, and shall henceforth be strictly protected, and not hunted or destroyed throughout Southern Rhodesia.



No. 237 of 1906.

## GAME LAW CONSOLIDATION ORDINANCE, 1906 : CLOSE SEASON, &amp;c.

UNDER and by virtue of the powers conferred upon me by the "Game Law Consolidation Ordinance, 1906," I do hereby cancel and withdraw all notices relating to game preservation and issued in terms of "The Game Preservation Ordinance, 1899," and declare the following to be of force and effect in lieu thereof :—

## CLOSE SEASON.

1. In the whole of Southern Rhodesia, the close season for game in Class "A" shall be from 1st November to 30th April in each year.
2. In the whole of Southern Rhodesia, the close season for game in Class "B" shall be from 1st December to 30th June in each year.
3. Up to 31st March, 1908, the following game shall be strictly protected and not hunted or destroyed within the respective areas mentioned :—

- (a) Oribi, within the magisterial district of Charter. —
- (b) Grysbok, within the magisterial district of Bulawayo.
- (c) Koorhaan, throughout Southern Rhodesia, except the magisterial districts of Charter and Victoria.
- (d) All game within the limits of the commonages or townlands of Salisbury, Bulawayo, Umtali, Gwelo and Enkeldoorn.

4. The operation of Section 12 of the said Ordinance shall be suspended in regard to Class "A" up to 31st December, 1907, and Class "B" up to 30th June, 1907, from date hereof within the magisterial district of Melsetter.

5. That the operations of Sections 5 and 12 of the said Ordinance shall be suspended in regard to all game in Classes "B" and "C," except Ostrich, Elephant, Zebra, Hippopotamus, Rhinoceros, black and white; and all such of the Antelope species as are not contained in Classes "B" and "C" of the said Ordinance within the limits described in the schedule hereto, as to the districts of Hartley and Lo Magondi.

6. All game is strictly preserved and shall not be hunted or destroyed until further notice within the following area, which is declared a game sanctuary :—

An area in the Urungwe Sub-district of the District of Lo Magondi in the Province of Mashonaland, bounded as follows :—

On the North and West by the River Zambesi, starting at the point where the Loenzi River joins the Zambesi and following the course of the latter river to its junction with the Sanyati River.

On the East by an imaginary line drawn from the junction of the Indurume and the Nyaodsa Rivers to the headwaters of the Loenzi River and thence along the course of the Loenzi River to its junction with the Zambesi River.

On the South by an imaginary line drawn due West from the point of junction of the Indurume and Nyaodsa to the Sanyati River, thence along the course of this river to where it enters the Zambesi.

## SCHEDULE.

1. Hartley District.—Along the North side of the Railway from Umfuli Bridge to Umzwezwe Bridge, thence along the Umzwezwe River to its junction with the Umnyati, thence along the Umnyati to its junction with the Umfuli, along the Umfuli to its junction with the Umsengezi, up the Umsengezi to the Hartley-Lo Magondi footpath crossing near Madzorera Kraal, thence along the Hartley-Lo Magondi footpath to Umfuli Bridge.

2. The whole of the Lo Magondi district except within the limits declared a game sanctuary under Section 6 hereof.

No. 187 of 1906.

26th July, 1906.

## IMPORTATION OF CATTLE.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby declare and make known that notwithstanding any general prohibition against the importation of cattle into this Territory such importation will be allowed under the following conditions:—

1. Cattle *bona fide* required for breeding purposes may be introduced from the Cape Colony provided that the permission of the Chief Inspector of Cattle is first obtained.
2. Every application for such permission shall be accompanied by a certificate in form A hereunto annexed.
3. Cattle introduced from the Cape Colony shall have not more than two permanent central incisor teeth: they shall be introduced by rail only and shall upon and after arrival at the importer's farm or at their destination be effectually isolated from all other cattle for such period as may be directed by the Chief Inspector of Cattle.
4. Cattle may be imported from North-Eastern Rhodesia provided that
  - (a) The permission of the Chief Inspector of Cattle be first had and obtained, which permission the said official shall have full discretion to refuse.
  - (b) All cattle be introduced by way of the port or town of Feira, which is hereby declared a port of entry for cattle, and taken to Sipolilos.
  - (c) Such cattle be submitted for inspection and passed by a duly authorised officer at Feira and at Sipolilos and such inspection be noted on the permit originally granted.
5. On and after the 1st day of November, 1906, Cattle may be imported from North-Western Rhodesia provided that,
  - (a) The permission of the Government Veterinary Surgeon at Bulawayo be first had and obtained, which permission the said official shall have full discretion to refuse.
  - (b) All Cattle imported shall be conveyed by the shortest possible route to the Railway Station at Victoria Falls, which is hereby declared a port of entry for cattle, and shall there be entrained and conveyed by rail to the centre of consumption.
  - (c) On arrival at their destination such cattle shall be subject to all the regulations controlling the movement and disposal of slaughter cattle.
6. Every application for permission to introduce cattle from North-Eastern and North-Western Rhodesia shall be accompanied by a certificate in the form B annexed to this notice.
7. Cattle may be imported from Great Britain or Ireland, provided
  - (a) That every animal so imported is accompanied by a proper and satisfactory certificate signed by a qualified Veterinary Surgeon that such animal was submitted to and resisted the tuberculin test for tuberculosis either before being embarked or upon arrival in port, or
  - (b) That if such certificate be not produced every animal so imported shall be submitted to such quarantining and testing for tuberculosis as may be directed or approved by the Chief Inspector of Cattle.
  - (c) That in the event of any test ordered and made disclosing the existence of tuberculosis the animal infected shall not be removed alive from the place where quarantined, but shall be there killed, and the owner shall be allowed to deal with the carcass as he may deem fit except that he shall not without special permission from a Government Veterinary Surgeon allow the meat to be used for human consumption.
  - (d) And that all of expenses of inspection, quarantine, testing, destruction or disposal shall be borne by the owner of such cattle.

8. Any person introducing cattle into Southern Rhodesia otherwise than in accordance with these regulations or submitting any certificate false in any material particular or refusing or neglecting to submit cattle introduced to proper inspections and tests, or failing to properly isolate such cattle when introduced shall be liable to a fine not exceeding £10 for every animal in connection with which the offence complained of is committed and in default of payment of any fine inflicted to imprisonment with or without hard labour for any period not exceeding three months and the cattle in regard to which the complaint has been laid and proved shall be liable to destruction without compensation.

#### ANNEXURE "A."

I certify that the animals enumerated below have been in my possession since birth, and that Lung sickness, Contagious Pleuro-Pneumonia or any other contagious or infectious disease has not existed amongst any of my cattle or on my farm within the last three years, and that such cattle in travelling to..... Station will not come in contact with any animals amongst which Lung sickness or any other infectious or contagious disease has existed during that period.

Signature.....

The above mentioned facts are to my knowledge true and correct.

Date.....  
..... District.  
Cape of Good Hope.

Resident Magistrate.

Number of Animals..... Bulls..... Heifers.....  
Breed.....  
Seller's name and address.....  
Purchaser's name.....  
Place in Rhodesia to which animals are being sent.....

#### ANNEXURE "B."

I certify that the animals enumerated below have been in my possession for twelve months, and that no case of Lung sickness or other contagious disease has occurred amongst them or other cattle with which they have been in contact, and that in travelling to Feira (or Victoria Falls) they will not come in contact with any cattle amongst which Lung sickness or other contagious disease has existed during the last two years.

Signature.....

The above mentioned facts are to my knowledge true and correct.

Magistrate, District Commissioner, or J.P.  
N.E. Rhodesia.  
N.W. Rhodesia.

Date..... District.....  
Number of Animals..... Bulls..... Cows.....  
Heifers..... Bullocks.....  
Breed.....  
Seller's name.....  
Purchaser's name.....  
Place in Southern Rhodesia to which  
animals are being sent.....



No. 188 of 1906.

26th July, 1906.

## AFRICAN COAST FEVER.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel and withdraw the regulations promulgated by Government Notices Nos. 264 of 1905 and 164 of 1906 and declare the following to be of full force and effect in lieu thereof within the Province of Matabeleland, exclusive of the District of Gwelo as described and defined by section 4 (c) of the "Southern Rhodesia Boundary Regulations Amendment Regulations, 1898," which area is hereby declared to be an area infected with a destructive disease and is hereinafter called the said area.

1. No cattle shall be moved from any other part of the Territory of Southern Rhodesia into the said area.

2. The movement of cattle to, from or across any defined area appearing in the schedule hereto or any area which may hereafter be added to that schedule so long as such area remains in and is not withdrawn from the schedule is absolutely prohibited save and except as is provided for in sections 3, 6 and 7 of these regulations.

3. The movement of all cattle within the said area is prohibited save and except

- (a) On permission granted by an Officer specially authorised thereto by the Administrator.
- (b) Within the boundaries of any single farm where such cattle are depastured.
- (c) Within an area of land enclosed by a substantial fence.
- (d) Within a radius of four miles of any native kraal situate within the boundaries of any Native Location or Reserve, and as is hereinafter further provided.

4. The movement of cattle for slaughter, *bona fide* farming, mining or breeding purposes or for private milk supplies shall be permitted under the written authority of an official thereto duly authorised subject to the following terms and conditions:

- (a) That cattle are moved to the nearest or most suitable railway station or siding, and thence by rail to their destination, or, where the district is not served by a railway by the most suitable route to their destination, all cattle travelling by road shall be under the personal supervision of a responsible white man approved of by the Cattle Inspector or of a native approved of by the Native Commissioner and the Cattle Inspector of the district within which the movement takes place.
- (b) That written permission of owners, occupiers or managers of all occupied land, and in the case of Native Reserves, of the Native Commissioner of the District over which such cattle shall pass to the nearest station, siding or destination is obtained; provided that in the event of such owners, occupiers, managers or Native Commissioner refusing to grant such permission, the Controller of Stock may direct the issue of a permit of removal, if satisfied that the necessary permission is withheld without good and sufficient cause.
- (c) That such cattle shall before being moved, be thoroughly disinfected by dipping or by spraying to the satisfaction of the Officer issuing permit, and at the expense of the owner of such stock, and if intended for slaughter shall where possible be branded under the supervision of the Officer issuing permit with the letters "V.D." on the near side of neck.
- (d) That cattle intended for slaughter shall, on arrival at destination subject to the terms of clause (e) hereof, be immediately taken to the prescribed quarantined area and there be quarantined and confined, and where not branded in terms of clause (c) hereof, be similarly branded under the supervision of a duly authorised officer.
- (e) That all cattle intended for slaughter brought to their destination and not disinfected by dipping or spraying in terms of clause (c) hereof shall be immediately taken to the public dipping station and there be thoroughly dipped or sprayed before being taken to the quarantine area.

- (f) That all cattle admitted to the quarantine area shall be slaughtered within twenty-one days of their admission, and under no pretext whatever shall cattle so admitted be permitted to leave the said area alive; all such cattle shall after admission to the said area be considered as likely to be infected with disease and if found wandering outside the said area or in possession of any person may be destroyed under an order of the Chief Inspector or Controller of Stock.
- (g) That on arrival at destination cattle other than slaughter cattle shall be dipped or sprayed and shall be effectually isolated from all other cattle on the same land for a period of four weeks.
5. The movement of working cattle may be permitted under the following conditions only:—
- (a) Within a radius of six miles of any working mine or mine in course of development for the purposes of such mine, provided that such cattle shall only be moved under a permit of a duly authorised officer, and shall be dipped every fourteen days or where no dipping tank is available be thoroughly sprayed with an approved dip, provided further that such permission shall not be granted when it conflicts with any other section of these regulations, or if such movement is considered dangerous to other cattle within the six mile radius.
- (b) Within the said area from private farms and trading stations to any centre of consumption or to a Railway Station or Siding within the said area under the permit of a duly authorised officer, which permit shall fully set forth the route to be traversed, provided that no such permit shall be issued until the person applying for same shall produce the written consent of the owners, occupiers or managers of occupied lands proposed to be traversed, and, in the case of Native Reserves, of the Native Commissioner, and that such cattle shall before being moved be thoroughly disinfected by dipping or spraying at the expense of the owner and to the satisfaction of the Officer issuing the permit; provided further that in the event of such consent being unreasonably withheld, the Controller of Stock may direct the issue of a permit.
6. In the event of the failure of pasturage or water on land on which cattle are located, the movement of such cattle will be permitted, provided:—
- (a) That such movement shall be to nearest available pasturage by the most suitable route.
- (b) That written consent be obtained in terms of Section 4 (b) hereof.
- (c) That movement shall be by permit only of a duly authorised officer, and under the supervision of a responsible white man, or of a native approved of by the Cattle Inspector and Native Commissioner of the district.
7. For the purposes of cleansing an area from disease the Controller of Stock may, on the authority of the Administrator and on the advice of the Chief Inspector of Cattle, and subject to such conditions as may be stipulated, permit the removal of cattle from a scheduled area to an adjacent clean area.
8. All applications for the removal of cattle under sections 4 and 5 hereof shall be submitted to and approved of by the Veterinary Department before being granted and when such movement is from one Native District to another the application shall be submitted for the approval of the Government Veterinary Surgeon at Bulawayo and the Native Commissioners of the Districts to and from which the removal is made.
9. All permits granted under the provisions of this notice shall specify the number and brands of cattle, route to be traversed, and time allowed for each journey; any breach of these or other conditions endorsed on the permit by the issuing officer shall be deemed a contravention of these Regulations in terms of section 14 hereof.
10. All veld-fed animals within the limits of the various Commonages or Townlands or other centres where there is common grazing ground, and wherein cases of African Coast Fever have occurred within two years of the date of publication hereof, and upon which public dipping tanks have been established, shall be dipped therein at least once every fourteen days: provided that the Controller of Stock may, on the advice of the Veterinary De-

partment, direct the temporary suspension of this regulation for such reasons as he may regard as sufficient.

11. The following charges shall be paid at the time of dipping by the owner of the cattle or other animals required to be dipped under these Regulations in respect of any dipping done at a public dipping tank :—

|   |                    |
|---|--------------------|
| For cattle (over six months) . . . . .      | 3d. per head.      |
| For horses and mules . . . . .              | 3d. „              |
| For calves (six months and under) . . . . . | 2d. „              |
| For small stock . . . . .                   | $\frac{1}{4}$ d. „ |

with a minimum charge of 6d. for any number of animals not aggregating such fee under above tariff.

12. Any disinfecting by spraying required to be done under these regulations shall be carried out with an approved insecticide by the owner of the animals so sprayed ; provided that the Inspector may, at his discretion, carry out such disinfection with the assistance of and at the entire cost of the owners of the animals to be sprayed, the cost of such disinfection being payable at the time of the spraying.

13. Whenever the owner, occupier, or manager of a farm shall adopt measures for the cleansing of his cattle running thereon, either by spraying or dipping or by any other method permitted by these or any other regulations, the Cattle Inspector may order such natives or others as have cattle on the said farm to cleanse such cattle, and the Native Commissioner of the District in which such farm is situated may enter into an arrangement with the native owners of cattle to cleanse such cattle at a charge to be mutually agreed between the said owner, occupier, or manager and the said native owners.

14. Any person contravening any of the provisions of these regulations shall, upon conviction, be liable in respect of each offence to the fines and punishments prescribed by the Ordinance, and in cases where no special punishment is provided, to a fine not exceeding £20, or in default of payment to imprisonment with or without hard labour for any period not exceeding three months, unless the penalty be sooner paid.

#### SCHEDULE.

- (1) Fingo Location.
- (2) An area within a radius of ten miles of Ntolas Kraal on the farm Emangeni.
- (3) An area comprising the farms Upper and Lower Umvutcha, Reigate, Upper Nondwene, Mapane, Government Farm No. 5, Trenance and the plots adjoining the farms Umvutcha.

No. 189 of 1906.

26th July, 1906.

#### AFRICAN COAST FEVER.

**U**NDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel and withdraw the regulations promulgated by Government Notices Nos. 223 of 1905 and 115 of 1906, and declare the following to be of full force and effect in lieu thereof within the Province of Mashonaland and the Fiscal Division of Gwelo as defined by the "Southern Rhodesia Boundary Regulations Amendment Regulations, 1898," which areas are hereby declared to be areas infected with a destructive disease :—

1. The movement of all cattle within the said area is prohibited save and except :—

- (a) On permission granted by an officer specially authorised thereto by the Administrator.
- (b) Within the boundaries of any single farm where such cattle are depastured.
- (c) Within any area of land enclosed by a substantial fence.
- (d) Within a radius of four miles of any native kraal situate within the boundaries of any native location or reserve and as is hereinafter further provided.

2. The movement of cattle for slaughter purposes shall be permitted under the written authority of an officer thereto duly authorised, subject to the following terms and conditions :—

- (a) That such cattle are moved to the nearest or most suitable railway station or siding, and thence by rail to the centre of consumption.



or, where the district is not served by a railway, by the most suitable route to the centre of consumption, all cattle travelling by road to be under the personal supervision of a responsible white man approved of by the Cattle Inspector, or of a native approved of by the Native Commissioner and the Cattle Inspector of the district within which such movement takes place.

- (b) That the written permission of owners, occupiers or managers of all occupied land, and, in the case of Native Reserves, of the Native Commissioner of the District over which such cattle shall pass to the nearest station, siding or centre of consumption is obtained: provided that in the event of such owners, occupiers, managers, or Native Commissioners refusing to grant such permission, the Controller of Stock may direct the issue of a permit of removal if satisfied that the necessary permission is withheld without good and sufficient cause.
  - (c) That such cattle shall, before being moved, be thoroughly disinfected by dipping, or spraying, to the satisfaction of the officer issuing permit, and at the expense of the owner of such stock; and where possible, be branded under the supervision of the officer issuing permit with the letters "V.D." on near side of the neck.
  - (d) That such cattle shall, on arrival at the centre of consumption, subject to the terms of Clause (c) hereof, be immediately taken to the prescribed quarantine area and there be quarantined and confined and, where not branded in terms of Clause (c) hereof, be similarly branded under the supervision of a duly authorised officer.
  - (e) That all cattle brought into any centre of consumption and not disinfected by dipping or spraying in terms of Clause (c) hereof shall be immediately taken to the public dipping station and there be thoroughly dipped or sprayed before being taken to the quarantine area.
  - (f) That all cattle admitted to the quarantine area shall be slaughtered within twenty-one days of their admission, and under no pretext whatever shall cattle so admitted be permitted to leave the said area alive. All such cattle shall, after admission to the said area, be considered as likely to be infected with disease, and, if found wandering outside the said area or in possession of any person, may be destroyed under an order of the Chief Inspector or Controller of Stock.
3. The movement of cattle required for *bona fide* mining, farming, breeding and dairying purposes, and for private milk supplies, may be permitted on the written authority of a duly authorised officer, subject to the following terms and conditions:—
- (a) That such movement shall take place subject to the conditions set forth in Section 2, clauses (a), (b) and (c): provided that it shall not be necessary to brand such cattle as required by Clause (c).
  - (b) That on arrival at destination such cattle shall be effectually isolated from all other cattle on the same land for a period of four weeks.
  - (c) That the consent in writing to such movement be obtained from all owners of cattle on farms adjoining that to which movement takes place, and in the case of Native Reserves, of the Native Commissioner of the district, provided that should such consent be unreasonably withheld by any of the aforesaid persons, the Controller of Stock may direct the issue of a permit.
  - (d) That such cattle required for breeding and dairying purposes or for private milk supplies, when moved to within the boundaries of the various commonages, town lands, or of grazing land common to any mining camp or other centre where cases of African Coast Fever have occurred within two years, shall, if deemed necessary by the Chief Inspector of Cattle, be confined in some enclosed place approved of by the local Cattle Inspector, and, if a case of African Coast Fever occur in such enclosure, shall not be liberated therefrom except in terms of Section 4, Clause (b) hereof, until twelve months after the last occurrence of African Coast Fever within the enclosure in which they are kept, nor shall they be allowed after liberation to run upon any of the land specified herein, unless such land has been free from African Coast Fever for a period of twelve months.

- (c) All cattle introduced in terms of the preceding Sub-section (d) shall, on arrival, if not previously disinfected in terms of Section 2, Clause (c), be taken direct to the Government dipping station and dipped or sprayed.
  - (f) All cattle confined in terms of this section and all calves born within the said enclosures shall be sprayed every fourteen days as may be directed by the Cattle Inspector.
  - (g) No cattle shall be moved from one Native District to another unless with the permission of the Chief Inspector of Cattle and the Native Commissioners of the districts to and from which such movement takes place.
4. All calves under twelve months old running within the boundaries of the various commonages, town lands, or on grazing ground common to any mining camp or other centres where cases of African Coast Fever have occurred within twelve months of the date of these regulations, or born thereon after such date, shall be removed to some enclosed place approved of by the local Cattle Inspector, and shall not be liberated or allowed to run at large on such commonage, town lands or common grazing ground until twelve months after the occurrence of the last case of African Coast Fever within the enclosure in which they are confined or upon such commonage, town lands or common grazing ground.
- (a) No calves shall be permitted to accompany working cattle travelling, and all calves born of such working cattle whilst travelling shall not be removed from the place where born.
5. For the purpose of cleansing an area of disease, the Controller of Stock may, under the authority of the Administrator and on the advice of the Chief Inspector of Cattle, subject to such conditions as may be stipulated, permit the removal of calves and other cattle to an adjacent clean area.
6. The movement of working cattle other than those specified in Section 7 hereof, may be permitted within the following areas and on the terms and conditions hereinafter set forth:—
- (a) Within a radius of ten miles of any working mine, or mine in course of development, for the purposes of such mine: provided that
    - (1) Such cattle shall only be moved under permission of a duly authorised Officer, and shall be dipped every fourteen days where a dipping tank is available within such area, or, in the absence of a dipping tank, be thoroughly sprayed with an approved insecticide;
    - (2) That such permission shall not be granted where it conflicts with any other section of these regulations, or, if such movement is considered to be dangerous to other cattle within the ten mile radius.
  - (b) Within the boundaries of the following Native Districts, viz., Lomagundi, Marandellas, M'Rewas, M'Tokos, Makoni, Hartley, Inyanga, North and South Mazoe, Charter and Gwelo, as defined by Government Notice No. 13 of 1899, and from the farms "Shitowa" and "Soul Prop" to the Chiodzani Drift situate in the Umtali District, for *bona fide* farming purposes, subject to the following conditions:—
    - (1) That the movement will be permitted for such period as the Controller of Stock may in his discretion, and on the advice of the Chief Inspector of Cattle, deem expedient, provided that such permission may at any time be withheld or withdrawn without notice.
    - (2) That all applications for removal shall be approved of by the Chief Inspector of Cattle and the Native Commissioner of the District.
    - (3) That the consent of owners, occupiers or managers of occupied lands, or Native Commissioners is obtained in terms of Section 2, Clause (b).
    - (4) That all such cattle are dipped every fourteen days, where a tank is available, or, in the absence of a tank, are thoroughly disinfected by spraying.
7. The movement of "salted" or immune working cattle shall be permitted on the following terms and conditions:—
- (a) That such cattle have been registered and branded under the supervision of the Cattle Inspector with the brand "T.O." on near shoulder and the registration number on near horn, in terms of Section 7, Clauses (a) and (b) of Government Notice No. 109 of 1905.

(b) That the movement of such cattle shall only take place under the written permit of a duly authorised officer and subject to the condition that they are disinfected by dipping every fourteen days, where a dipping tank is available, or in the absence of a dipping tank, by thorough spraying with an approved insecticide.

(c) That movement of such cattle shall only be permitted:—

- (1) From the area comprised within the boundaries of the farms Mount Pleasant, Rhino Valley, Cheshire, Doorn Hoek, Vlaknek, Turner's and Sterkstroom in the Inyanga District, along the main road, between that area and the Rusapi Railway Station; provided that such cattle are dipped at Inyanga Police Station every fourteen days, and are not outspanned within a limit of four miles of Rusapi Station.
- (2) Along the main roads between the Old Umtali Township, the Penhalonga Mine and Umtali.
- (3) Along the main road from Umtali to Melsetter and Mount Silinda and all confluent roads on the infected area.

8. In the event of failure of pasturage or water on land on which cattle are located, the movement of such cattle will be permitted, provided:

- (a) That such movement shall be to the nearest available pasturage by the most suitable route.
- (b) That written consent be obtained in terms of Section 2, Clause (b) hereof.
- (c) That such movement shall be by permit only of a duly authorised officer, and under the supervision of a responsible white man, or of a native approved of by the Cattle Inspector and Native-Commissioner of the District.

9. All applications for the removal of cattle under Sections 2, 3 and 8 hereof shall be submitted to and approved of by the local Veterinary Officer before being granted.

10. All permits granted under the provisions of this Notice shall specify the number and brands of cattle, route to be travelled and time allowed for each journey, and all conditions endorsed on such permits by the officer issuing the same shall be strictly observed.

11. All veld-fed animals within the limits of the various Commonages or Town Lands or other centre where there is common grazing ground and wherein cases of African Coast Fever have occurred within two years hereof, and upon which public dipping tanks have been established, shall be dipped therein at least once every fourteen days; provided that the Controller of Stock may, on the advice of the Veterinary Department, direct the temporary suspension of this regulation for such reasons as he may regard as sufficient.

12. The following charges shall be paid at the time of dipping by the owner of the cattle or other animals required to be dipped under these regulations in respect of any dipping done at a public dipping tank:—

|   |               |
|---|---------------|
| For Horned Cattle (6 months and over)       | 3d. per head. |
| For Horses and Mules                        | 3d. "         |
| For Calves (6 months and under) and Donkeys | 2d. "         |
| For Small Stock                             | 1d. "         |

with a minimum charge of 6d. for any number of animals not aggregating such fee under above tariff.

13. Any disinfecting by spraying required to be done under these regulations shall be carried out with an approved insecticide by the owner of the animals so sprayed: provided that the Inspector may, at his discretion, carry out such disinfection with the assistance of and at the entire cost of the owner of the animals sprayed, the cost of such disinfecting being payable at the time of spraying.

14. Whenever the owner, occupier or manager of a farm shall adopt means for cleansing his cattle running thereon, either by spraying or dipping or any other method permitted by these or any other regulations, the Cattle Inspector may order such natives or others as have cattle on the same farm to cleanse such cattle, and the Native Commissioner of the district in which such farm is situated may enter into an arrangement with the native owners of cattle to cleanse such cattle at a charge to be mutually agreed upon between the said owner, occupier or manager and the said native owners.

15. Any person contravening the provisions of these regulations shall be liable to the punishments prescribed by the Ordinance, and in cases where no special punishment is prescribed by the said Ordinance to a fine of £20 or to three months' imprisonment with or without hard labour in default of payment of any fine inflicted.



## Departmental Notices.

### DESTRUCTION OF WILD CARNIVORA.

It is hereby notified for public information that commencing on 15th June, 1906, rewards will be paid for the destruction of wild carnivora, within the limits of Southern Rhodesia, on the following terms and conditions, viz.:

£2 10s. each for Lions.

£1 each for Leopards and Cheetahs.

10s. each for Wild Dogs.

5s. each for Jackals, Tiger Cats and Redcat or Lynx.

2s. 6d. each for Baboons.

1s. each for Grey Monkeys.

Rewards will be paid to Europeans by the Magistrate or Native Commissioner, and to natives by the Native Commissioner of the District.

In proof of destruction, applicants for rewards will be required to produce and surrender the skulls of lions and the tail and skin of head and neck of other animals destroyed. Of young animals, where the tail is less than six inches in length, the complete skin must be produced.

Applicants must be prepared to make a solemn declaration to the effect that the animals for which rewards are claimed have been captured and killed within the boundaries of the district of Southern Rhodesia wherein the claim is made and subsequent to June 15th, 1906.

### FARM APPRENTICES.

The Secretary for Agriculture would be glad to receive the names of farmers who would be willing to receive young Englishmen desirous of obtaining acquaintance with local systems of agriculture before taking up land on their own account, and also the terms on which such would be received, as he is in constant receipt of enquiries for such employment.

### STRYCHNINE.

Stockowners can obtain a limited quantity of strychnine for the destruction of carnivora at a cost of 1s. 6d. per half ounce.

## DONKEYS.

The B.S.A.P. Transport Department offer two pure-bred Zanzibar donkey stallions for service. Stud fee, ten shillings. Further particulars may be obtained from the O.C., Transport, Salisbury.

## GOVERNMENT STALLIONS FOR PUBLIC STUD.

The stallions "Robber Knight," and "Dolfos" having been secured for public stud purposes in the Provinces of Matabeleland and Mashonaland respectively, will be stationed at Bulawayo and Salisbury, where a limited number of mares can be served free of charge.

Applications, giving full particulars of the mares to be served, should be addressed to the Veterinary Officers at Bulawayo and Salisbury, from whom further particulars can be obtained.

The owners of mares brought to stud will have to make all necessary arrangements for attendance, stabling and feeding of their animals, as the Department can take no responsibility whatever.

As the number of mares which can be served is very limited, the Veterinary Officers in charge are instructed to refuse service if any mare submitted is suffering from any hereditary disease or is of an inferior type.

## VAPORITE.

The new preparation, "Vaporite," suitable for the destruction of cut-worms, wire-worms, white ants, and other soil-infesting pests, can be obtained from the Department in quantities of not less than 2 cwt. at 17s. 6d. per cwt. Application to be accompanied by remittance covering cost and transport charges.

## GRAM.

A limited quantity of fresh imported seed is available at 3½d. per lb. on application to the Department, accompanied by remittance for cost and transport.

## PRIZE COMPETITION FOR RHODESIAN GROWN TOBACCO LEAF.

The following prizes are offered by the British South Africa Company to be awarded for the best crops of tobacco leaf grown each season during the two years, 1907 and 1908.

1. For Rhodesian grown leaf from Turkish seed and cured in the usual Turkish manner.

(a) Best crop weighing between one thousand and five thousand pounds: £25

(b) Best crop weighing five thousand pounds and over: £75.

2. For Rhodesian grown leaf from American seed and flue cured.

(a) Best crop weighing between one thousand and five thousand pounds: £25.

(b) Best crop weighing five thousand pounds and over: £75.

### CONDITIONS OF COMPETITION.

1. All competing crops must be cured, dried, packed in bales and delivered for sale at one of the Company's warehouses in Rhodesia.

2. Picked or selected exhibits representing but a portion of a crop cannot enter for competition.

3. Any or all competing crops may be disqualified by the Judges, if in their opinion they are not properly packed or in keeping condition.

4. Two Judges, both expert tobacco leaf men, will be appointed, one to be nominated by the British South Africa Company, and the other by the Rhodesian Agricultural Union. If necessary, an Umpire may be nominated by the Judges.

5. No competitor shall enter for both prizes in the same class.

6. All competing crops shall be the product of the season in which they are entered for competition.

7. Crops can be lodged at one of the Company's warehouses, which will be advertised later, any time during the season up to the end of December, but notice of intention to enter for competition should be sent to the Agricultural Department at as early a date as possible, and not later than 31st October in each year.



## Editorial Notices.

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Original subscribers to the *Journal*, who have complete sets of the earlier numbers to dispose of, are requested to communicate with this office, as numerous enquiries for the first and second volumes, now out of print, have been received.

Subscriptions to the *Journal* (5s.), issued bi-monthly, should be addressed to the paymaster, Agricultural Department, Salisbury. Only communications relating to the literary department should be addressed to the Editor, and if an answer is required in the pages of the *Journal*, should reach this office not later than the 15th of the month preceding publication. Charges for the insertion of advertisements will be forwarded upon application to the paymaster. Subscribers are requested to notify immediately the non-delivery of the *Journal*.

Farmers requiring latest market prices for produce and live stock at Kimberley, Johannesburg, Bulawayo, Gwelo, Salisbury, Umtali, and Beira, can obtain same from this office by next mail or prepaid wire.

Advertisements will be accepted from *bona fide* farmers wishing to effect sale, purchase or exchange of produce, live stock, or farm implements, at a minimum charge of 2s. 6d. per insertion of 20 words. Extra words will be charged for at the rate of 1s. for every ten words.

Messrs. Hart and Co., Parker's Buildings (P.O. Box 898), Cape Town, Advertising Agents for Cape Colony, Transvaal, Orange River Colony, Natal, and Great Britain. J. Kapnek, P.O. Box 91, Salisbury for Rhodesia.

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## Farmers' Advertisement.

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**B**REEDER of Dairy Cattle and Persian Sheep has on hand Young Bull Calves from Cape Cows (Frieslands); Young Rams (pure Persians); Bull Calves, £10 each, taken at 8 months; Rams, £3 each.—C. C. Macarthur, Box 284, Salisbury.

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# MEIKLE BROS.,

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**SALISBURY,**

 **Direct Importers.**

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**Agricultural Implements,**

**Dairy Appliances.**

**Provisions.**

**Hardware.**

**Cattle Dips.**

**Spray Pumps.**

— Etc., Etc. —

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## PLOWS.

Moline Disc. 1, 2, 3, 4, Fur.

Flying Dutchman, 2, „

Oliver Single Fur. Mouldboards.

Wiard, Hillside, etc.

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## PLANTERS.

2 Row "Champion."

3 Row Deere and Mansur Coy.

Aspinwall's Potato Planter and Sorter.

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## CULTIVATORS.

Martin's 7 and 9 time.

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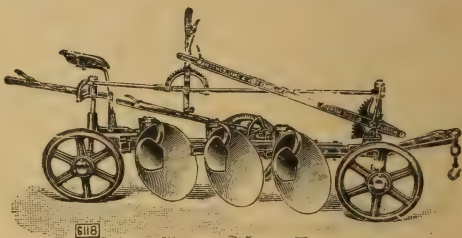
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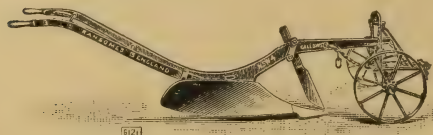


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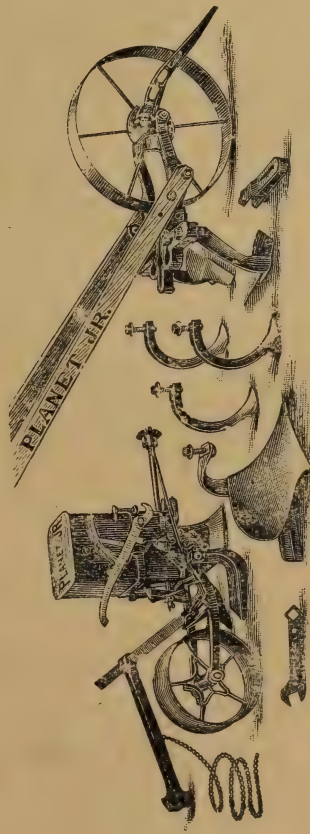
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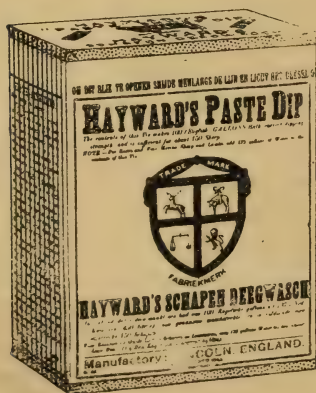
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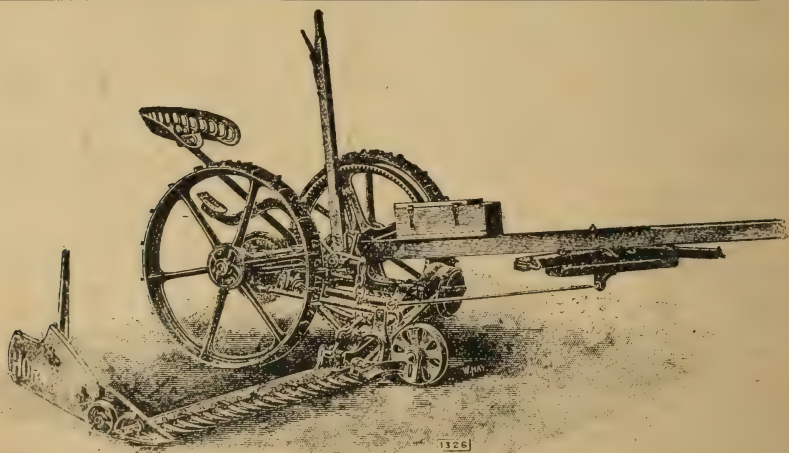
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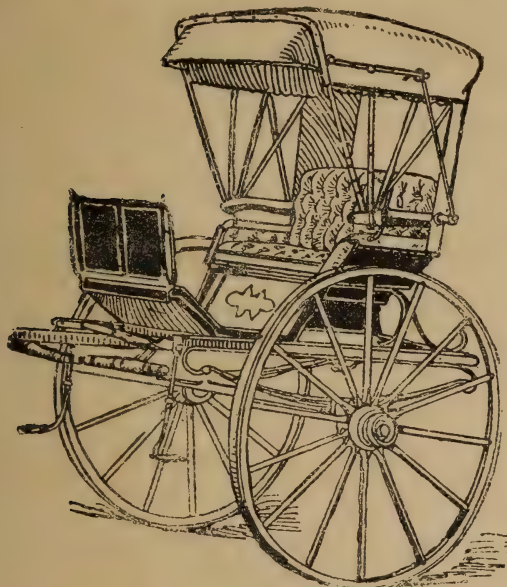
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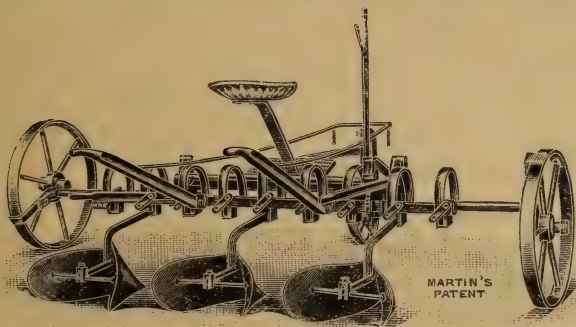


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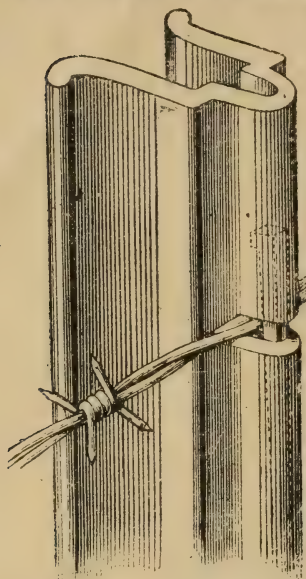
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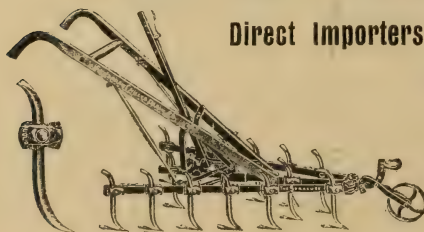
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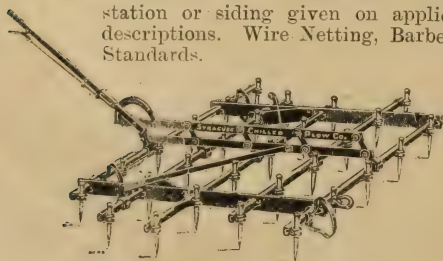
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# THE RHODESIAN AGRICULTURAL JOURNAL

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## **Editorial.**

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Since the publication of our last issue, the Agricultural Shows have been successfully held at the four large centres, Umtali, Bulawayo, Gwelo and Salisbury. The value of these Shows cannot be over-estimated. In the first place, it should be recognized that an exhibition of farm produce in each of the leading districts is of great value, not only to the farmer, but to the district, and, finally, to the country and to all those who have money invested in it. The farmer, brought into contact with others practising the same profession, discusses his hobby, compares his successes and failures with his confrères, picks up numerous hints and suggestions whereby his profits may be increased and his losses reduced. The spirit of friendly rivalry—the finest stimulus to work and original effort—is brought forth and fostered on the show ground.

In a country such as ours, the meeting of men from far-distant centres, the interchange of ideas among workers under similar or vastly different conditions, must be of the utmost importance to an industry but still in its infancy and even now passing through its

experimental stages, an industry, moreover, greatly modified by local peculiarities and constantly requiring the remodelling of text-book rules.

A good Show, with first-class exhibits, is an advertisement to the district—the finer the exhibits the greater will be the impression on the visitor, who may be tempted to invest money in the district, if not to settle there. On the other hand, the visitor may be desirous of ascertaining whether certain products can be obtained from the locality, and it is the duty of settlers and farmers in the district to demonstrate, by the number and excellence of their exhibits, what they can produce, and thus prepare themselves for any market that may be open to them.

Again, an attractive Show will bring money into the town, whereby the store and hotel keepers will profit, and it is, therefore, deserving of the support of the commercial classes.

Ocular demonstration of the steady progress of agriculture year by year is afforded by the annual Shows; especially is this the case in such classes as mealies and tobacco, by giving an illustration of the most desirable type to produce, and to avoid producing that type, especially of tobacco, which is easiest to grow and cure, but most difficult to dispose of.

The paucity of exhibits at the Umtali Show is to be regretted, since the visitor must have gone away with the mistaken idea that the district was not desirable from an agricultural standpoint. The absence of exhibits from some of the leading farmers was most regrettable, but its importance would have been minimised had small growers realised that their more modest contributions were of equal importance in establishing an object lesson on the possibilities of the district.

The cattle section was the chief feature of the Bulawayo Show, but the second day practically developed into a large stock sale, which was to be regretted, seeing that the express purpose and educational value of the Show was to a great extent defeated.

The absence of cattle at the Salisbury Show, although prompted by most laudable care and forethought and the desire to avoid all possibilities of cattle disease disasters, was unfortunate, since high-class animals are



now becoming plentiful in the district, and keen competition and an excellent advertisement would have resulted. The excellence of the mealies, and the care taken by so many exhibitors in the selection of their exhibit, speaks volumes for the keenness of the farmers around the capital.

It was a pity that equal care was not shown in the sheep class. Many of the animals sent in for competition were scarcely fit for market purposes, and none, with but a few exceptions, were "got up" for show. The presence of imported animals for sale, obviously fitter, fatter and better selected than locally bred ones for show, was an object lesson which should not be forgotten by some of those who pride themselves on their knowledge of stock.

At all the Shows there was room for improvement in the judging and organisation, but it must be remembered that the special features of the agricultural industry in this country require special handling, based upon an experience which has to be gained on the spot. It is to be hoped that the shortcomings of the present year may teach their lessons and be avoided in the future.

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## Land Drainage.

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BY J. CAMERON.

Among all soil improvements which may be suggested for maintaining and extending the area of cultivated land in Rhodesia, drainage easily takes the first place.

To many it may seem strange, if not even absurd, to propose taking away water from the soil when one of the chief difficulties in cultivation is the want of it.

A few remarks, therefore, on the subject of drainage, together with its influence on soil—what it does and what it does not do—may prove of considerable interest.

At the outset it must be admitted that there are no actual examples in Rhodesia to refer to, either definitely proving the advantages of drainage or yielding information as to what the actual effects are on the soil—whether the productiveness is increased to a degree compensating for the outlay, or whether any special disadvantages might crop up.

Drainage, then, in Rhodesia can only be advanced on theoretical grounds, or deduction that what applies in remedying certain evils in other countries will apply here.

But there is no doubt whatever that many of the best agricultural lands in the country are impracticable for cultivation, or unprofitably cultivated solely on account of being too wet, or too easily injured by an excess of rain.

The position of Rhodesian agriculture may be stated thus: Lands that are naturally well-drained and best adapted for cultivation are composed of soils that generally do not bear much cropping. These lands, in order to maintain a high state of fertility, have to be manured and perhaps fallowed occasionally for this purpose. Lands that are naturally wet, on the other hand, are for that very reason rich in organic matter and other unused elements of fertility, only unavailable and useless on account of liability to become waterlogged.

It is worth considering, therefore, whether it would be more profitable in certain cases to drain the rich lands that are wet but inexhaustible or to apply manures to lands that are dry but poor.

But the term drainage has a far deeper significance attached to it in relation to its influence on the soil than merely running surplus water out; it also draws bottom water into and up through the soil during periods of drought.

Indeed the whole subject of drainage, as applicable to the circumstances attending the soil and climate of Rhodesia, has to be viewed differently in many respects in the effects sought after when comparing with the effects to be obtained in colder and more steadily humid climates.

In the first place, one of the chief benefits desired and obtained in cold and humid climates through drainage is to secure a dry seed-bed in the spring.

This means that lands at all given to wetness retain the winter rains and snows too long for getting the soil cultivated and crops sown in good condition.

But in Rhodesia there are neither winter rains nor snows, and any difficulty in the planting of crops arises from the ground being too dry.

To this extent then the matter of drainage in Rhodesia is simplified, since drainage is not so much required in wholly drying up land by removing the causes of wetness

entirely, but rather in order to control the amount of water in the soil to a degree, so that at no time during the period of growth there will exist an injurious excess.

Thus the actual need of drainage, in so far as the removal of surplus water is concerned, is in the great majority of cases confined to a few days at intermittent intervals during the rainy season. But there are other and equally potent reasons besides occasional surplus water rendering drainage beneficial, if not even necessary, to a greater or less extent on a very large number of farms throughout Rhodesia.

The occurrence of an excess of salts in the soil and subsoil has, perhaps, as much to do with the failure of crops in certain cases as the fact of the ground being at times too wet.

It also happens that those soils that are close in the texture, and are liable at times to become oversaturated with water, are the very class of soils wherein injurious salts accumulate. Herein, then, drainage is not only beneficial but equally necessary as where water only has to be dealt with.

There are, without doubt, large areas throughout Rhodesia where the soil is naturally well drained by means of a sufficiently porous subsoil, wherein salts never occur to an injurious extent.

But when these soils are under irrigation it often happens that salts do accumulate to an injurious extent, and therein lies the warning that, when laying on water for irrigation underground drainage should accompany for the purpose of taking water out.

It is well-recognised that throughout this country the sandy soils are not those that suffer most during a period of drought. Sandy soils having sufficient depth, possessing fineness and evenness in the texture, are furnished with drainage conditions that cannot be improved upon. But their capacity for resisting drought comes from the reciprocal action which their porosity affords for bringing bottom water up into the soil as well as letting it down.

Hence, in close-textured soils artificial drainage is resorted to in order to effect a change in their character, enabling them to act in a similar manner both in absorbing and giving up moisture.

The average rainfall in Southern Rhodesia for the past year was 32 inches, being slightly above the normal.



Almost the whole of that quantity fell in the months from November till March. But even within that time more than one half fell within a period of four or five weeks. And, again, throughout the whole period, but especially in February, one inch in twenty-four hours was frequent, while over four inches was registered at ten different stations throughout Rhodesia as having fallen in twenty-four hours.

The average number of rainy days was 73. The highest total was 67 inches, falling in 142 days, and the lowest 17 inches, falling in 44 days.

The mean temperature covering the period from November till March is 74 degrees, ranging from 50 to 100 degrees approximately.

The foregoing figures show that the rainfall is sufficient to cause wetness in all close-textured soils during the growing period.

No measurements have yet been made showing how much the drying of land is due to evaporation and how much is due to downward percolation. But it is evident that in all close-textured soils evaporation fails in removing the water rapidly enough from the underground layer of soil where the damage to the growing crop is taking place.

Evaporation is most active, not where and when the soil is wettest, but when the rains are over, and it carries on after the soil is sufficiently dry. Indeed evaporation in this country is one of the most constant enemies farming has to deal with, and all the operations of cultivation are chiefly directed in retarding it.

The advantage of drains in drying soil consists in the water being removed rapidly and only from the point where it is doing the greatest harm.

It must be noted that drainage does not diminish the amount of water that a soil is capable of retaining beneficially. Drains only carry away surplus water after the soil is fully saturated. If the excess is not removed it lies stagnant to the total exclusion of air, attended by a train of evil consequences to nitrification, etc.; in fact, crop roots simply die.

A soil is in its best growing condition, as regards moisture, when it contains from 30 to 40 per cent. of its total capacity, hence there is a wide margin for evaporation, even in the presence of drains, since they only act when a soil is saturated beyond its full capacity.

Fine grained sandy soils are well adapted for resisting drought, because they absorb readily a large amount of water and thereafter easily give it up.

Precisely in the same way clay lands absorb or soak in a great deal more rain after being drained than before, coupled with a correspondingly increased facility in giving it up.

This capacity given to stiff soils gradually increases after drainage. It has been observed that a diminished quantity flows out of drains after a few years without the land becoming more wet, a great deal more having been absorbed and retained by the soil.

It is probable that in this country drains would run only after two or three weeks heavy rain, and even then for a few days only; but their object would be largely accomplished, and their usefulness would still be active, in bringing bottom water up.

The following diagram shows how drainage acts in removing surplus water from the soil:—

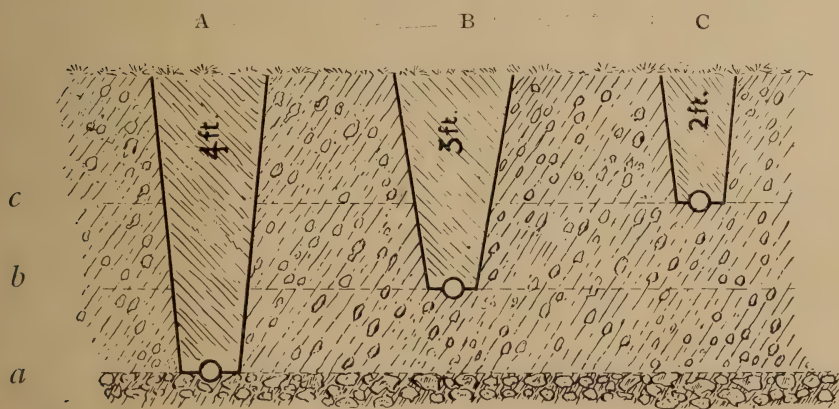


Diagram showing how drains act in removing water from soil.  
End section of tile drains in the soil.

A, B and C are three drains, 4, 3 and 2 feet deep respectively. Before the rains all are dry, with the soil dry till below *a*.

On rain falling it does not follow that the drains will immediately begin to run. It may take some time and a large amount of rain before any water makes its appearance.

The level of saturation being somewhere below  $a$ , all the rain that falls percolates downwards and is held by the soil till the level of saturation rises to  $a$ , when A begins to run. Should more rain continue, and A unable to carry all the surplus away, the level will rise to  $b$ , when B begins to run.

More rain still falling, and A and B both full, the level will rise to  $c$ , and C will also run. Should all three be full the water will rise to the surface and flow over it.

But when the rain ceases, the level is soon reduced to below  $c$ , when C ceases to run. But there is now two feet of dry soil for crops to make headway in.

Very soon the level is reduced to  $b$ , when B ceases to run, but affording another foot of dry soil.

Thereafter, when the level falls below  $a$ , A also ceases to run.

The same diagram serves in showing how drainage clears the soil of injurious salts.

When the soil is very dry all the soluble salts are crystallized throughout the upper soil, often appearing as a white efflorescence on the surface.

When rain falls the first effect is in dissolving these salts, and in heavy rains certain of the more soluble are carried down into the subsoil in solution. It happens, however, that salts of potash and all phosphates are retained and held in the upper nine or ten inches of soil. All soils have this property, but they do not retain sulphates of soda or magnesia nor chlorides after this manner; these salts are injurious to plant life, but they are easily soluble, and under proper drainage conditions they get leached out. But in impervious subsoils they are only carried a certain distance when they are retained and held in solution. However, in this particular position, crops will at first do very well; but, as soon as more heavy rains come on, the soil gets gradually saturated again from below upwards, with the consequence of its being again charged with these injurious salts.

Now, when the land is drained, the upward rise of water is run off, carrying these salts away in solution. Even although the water, after excessive rains, may rise to the surface over the drains, yet the whole charge is run off before these salts are again precipitated.

In actual practice drains are always cut at an equal depth, but no definite depth can be laid down applicable



to all soils. The proper depth for laying the tiles is the point where percolation ceases or becomes so slow that water accumulates. In soils standing in need of drainage this will be less than three feet; but tiles should be laid above rather than below that level in order to draw the water through as much soil as possible.

### LANDS THAT REQUIRE DRAINAGE.

There are large areas of rich land throughout Rhodesia that are not altogether clay soils, but what might be termed medium clay loam. These soils yield very good crops when the season is very dry, but they fail more or less in an average wet season. In most cases the drainage of such lands, so as to give a more certain yield, is neither very difficult nor expensive.

A single open ditch, cut through the centre along the lowest part of the land, will of itself go a long way in effecting the desired improvement through its merely providing an outlet. When this is insufficient, tile drains may be cut branching out and running perpendicular to the slope of the ground. These may be any distance apart, according to the amount of wetness manifested; about 60 feet will meet common cases. The depth will also vary with the nature of the soil, but a good rule to follow is, to lay the tiles just as deep as the plough will not interfere with them, or about 30 inches. It will be found better and cheaper to lay drains a little closer than to lay them deeper.

Generally speaking, the soils that stand most in need of drainage are the valley bottom or vleis.

In the great majority of cases these are not stiff impervious clays, but more often a layer of clay having a considerable porosity but not sufficient to dispose of the rainfall quick enough. Organic matter accumulates therein until there is a considerable thickness of humus, giving the soil the character of a clay loam, but still impervious to any considerable percolation.

In all such cases drains 60 feet apart and 30 inches deep, laid with 2-inch tiles, will accomplish all that is necessary towards drying the land.

It will be observed that red soils are never wet—that is, red soils are never found in a vlei, even although the surrounding soil is red, and on a formation that yields a

red soil. The black humus accumulates in wet ground, masking the red colour in the clay and sand, but this black vlel soil is essentially the same as the red, only containing an overwhelming amount of organic matter.

Besides, from actual rainfall, some soils are kept in a wet state through water oozing up from below. The rain falling on higher ground had percolated downwards and underneath till meeting with clay, when it comes up to the surface.

This type of wetness is often met with on a slope where the ground lying higher is of a very porous nature.

In such cases no more encouraging prospects for profitable drainage could be met with. When once drained, giving about 2 feet of dry soil on the surface, then the under ground water will furnish a perpetual stream of irrigation from the bottom, and without the expense of laying it on or keeping it going. Such lands are then suitable for growing winter crops including lucerne.

No definite system of drainage can be laid down applicable to all soils. Every case has to be considered by itself as to the plan to be followed and what is required in effecting the desired improvement.

### CONTROLLING THE RAINFALL.

In many, indeed it may be said on all soils, a very great deal can be done in controlling the rainfall by pursuing certain methods of tillage.

Thus, on soils that are inclined to be dry and never getting enough moisture, by ploughing and planting athwart the slope, and having all the open furrows running in this direction, then the amount of rainfall lost through running off the surface is reduced to a minimum.

Again, while in ploughing land immediately a crop is removed which has to lie over the dry season, harrowing should accompany in order to close up the surface for preventing loss of moisture; yet, when ploughing at the beginning of the rainy season, the land should be left with a considerable roughness of the surface in order to catch and absorb all the water possible.

It is the first rains, falling when the ground is very dry, that are most liable to be lost. Absorption in a very dry soil is at first very slow, on account of the soil being filled with air, this air having difficulty in escaping through the close film of water on the surface; but when

fresh moisture meets with bottom moisture percolation proceeds rapidly.

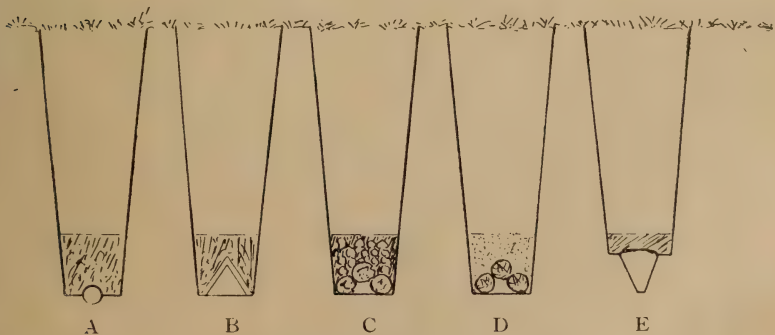
The foregoing principles will apply to a wide class of soils, including all sandy soils and most of the red soils; but certain types are reached, especially in bottom lands and vleis, where, besides getting water into the soil, some measures have to be taken in order to relieve excess.

Instead now of ploughing athwart the slope, the ridges should run perpendicular to, or at an angle to the slope. Such land may be cross-ploughed and harrowed to lie over the dry season, but, ploughing for crop, the ridges should run with the fall of the land. Again, open furrows should be left at intervals of 60 feet, more or less, according to the dampness or close texture to deal with.

In certain cases, where the ground is somewhat flat and inclined to become wet, the ploughing might be done consecutively in the same direction, beginning again at the centre of the ridge, thus heaping the soil further up towards the centre, while the open furrows will be by so much the deeper. It is only on pretty level lands that this can be done on account of the danger of sluiting.

But all systems of ploughing intended to ameliorate the growing conditions of wet lands, although serviceable are accompanied with manifest inconveniences; only while the working facilities are somewhat hampered the difference of having a good crop instead of having no crop at all, perhaps, is worth considering.

### DRAINAGE METHODS.



Different methods of drainage.

A, tile; B, flat stones; C, round stones; D, poles (wood); E, hard clay.

The foregoing diagram shows different methods that may be adopted in forming the duct for carrying off the water.



Tile drains are recommended because they are recognised universally as being wholly satisfactory in effecting the purpose for which they are used.

A is the common round tile. Tiles should never be less than two inches in diameter; and, of course, for main drains they must be from three to five inches. It is not essential that the tile should be a round cylindrical pipe, as it may be egg-shaped or horse shoe with a flat sole; but, in practice, round pipes are more easily laid, and, when laid down, they keep an open waterway better than any other shape, supposing they do shift position a little.

The clay that will make bricks will make tiles, while they are more easily burnt than bricks.

In estimating the cost per acre in draining land with tiles in Rhodesia, consideration must be given to the fact that the plant for the manufacture of tiles must first be imported, and all the minor obstacles and expenses inseparable from a new undertaking successfully met and got over. The cost of a tilemaking machine, capable of turning out two thousand two-inch pipes per day, will cost £20 in England. Three boys will do the work with this machine. Larger machines for power, costing £50, will turn out more than ten thousand pipes per day. Little more than half the wood is required for burning tiles than what is required for bricks.

In draining an acre of ground with the drains 42 feet apart, 1037 tiles 12 inches long are required. With drains 60 feet apart 726 tiles are required. In draining an acre 42 feet apart 345 yards are to be dug, and 242 yards when the drains are 60 feet apart.

The cost of digging drains depends chiefly on the depth, but partly on the hardness of the ground. Drains three feet deep cost one-third more than drains two and a half feet deep. It would be hard to say what the cost of digging drains would be with ordinary Kaffir labour, but an ordinary day's work for one man is from 20 to 25 yards two and a half feet deep.

There are no special tools required in forming drains, except a round-shaped scoop for taking out a groove for the tiles. An ordinary pick and spade will do all the rest equally speedily and well with all the patent tools in the market.

The essential thing in all drains is that the bottom may be made with an even fall. This is by no means a simple

matter when the ground looks almost level. While more is desirable, yet a fall of three inches in one hundred feet is sufficient, only it requires considerable nicety of judgment to carry out.

Where stones are convenient, they may be used in place of tiles and give good satisfaction. If the stones are somewhat flat, they may be laid against each other in the bottom of the drain forming a triangular duct as at B. They are keyed and held in position by small stones jammed between them and the sides of the drain.

Where the stones happen to be small round boulders, they may be laid as at C, one on each side and one lying over both, so as to form the duct. There is no occasion to lay a large quantity of small stones on top, but merely a few small pieces over the openings. The clay material coming from the bottom of the drain, packed closely over the stones, will serve very well in preventing loose earth dribbling in and silting up the duct.

Stone drains do very well where there is plenty of fall, but they are not any cheaper than tiles, and may even be more costly if the stones have to be ridden any distance. They are, of course, more readily obtained in many cases than tiles.

Where there are neither stones nor tiles to be had, poles may be used cut from the bush and laid down as shown in D, with the heavy end towards the head of the drain. These poles should be convenient lengths, and about three inches in diameter at the butt end. They are laid one on each side and one covering half of each forming the duct. They are covered with scrub of some sort, over which a layer of clay material is flattened over to prevent silting.

Such drains work very well, and where the wood is kept continually moist they last a good number of years. Where bush is plentiful the plan is easily carried out.

In certain soils, where there is a firm clay bottom, another plan is feasible where neither tiles, stones, nor poles are employed, but where the duct is formed in the bottom itself, as shown at E. These are called shoulder drains. A certain depth is first cut, nearly two feet, having a considerable width at the bottom. Then, with a narrow-mouthed spade, a section at the bottom is cut out having a V shape, leaving a shoulder on each side. Over this some turf or hard clay is laid across, forming the duct below.

The chief merit of shoulder drains is their practicability when no other methods are available, coupled with small cost.

The cost of tile draining, 42 to 60 feet apart, will be from £3 to £5 per acre. With stones or poles it will be about the same, but shoulder drains will be a good deal less.

The above sum is not a prohibitive outlay, when it is taken into account that only the most fertile lands would be undertaken. There are many cases where it would pay better to lay out that sum upon certain land than to cultivate other lands which cost nothing. In a pioneer country it must be said that such initial outlay is far from being an easy undertaking. However, there is no doubt whatever that all lands under irrigation, and also many orchards, will amply repay the cost of draining. Lucerne, forage and wheat will succeed much better where the land is drained, even where irrigation is included.

It is also a subject for inquiry whether the rust in cereals, including mealies, is not in great part due to an unhealthy state of the subsoil. There are indications that land that is well-drained bears a crop less affected with rust than land having an impervious subsoil.

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## Jute.

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The chief crops of the world are marketed in Jute bags, and of new jute sacks and bags several hundred millions are produced each year, besides a far larger annual turnover of second-hand bags. In Bengal the largest amount of the raw fibre is produced; and, although the area under cultivation is extending, the demand for jute fibre is steadily increasing.

Jute can be grown in this country, as will be seen from the following report:—

Report on Jute grown at the Victoria Falls by Mr. ALLEN:—

Messrs. Coe Bros., of Dundee, say:—"This is a very good attempt to produce fibre equivalent to jute; and, although it is somewhat harsh in places and some cross fibre is present, after some softening very good results should accrue.



"The good fibre among the sample is strong and glossy, and the nearest I have seen to Jute of any of the substitutes I have seen up to now.

"The character of the Indian fibre is there, and, altogether, I consider the proposition a most promising one."

The price of Bengal Jute is at present, roughly, £35 per ton c.i.f. Dundee.

Jute belongs to the natural order Tiliaceae and to the genus *corchorus*. The commercial fibre jute is obtained from the two species known as *corchorus capsularis* and *corchorus olitorius*, of each of which there are several varieties or races. The former is easily distinguished by its rounded short capsules, while the latter bears long cylindrical pods. Both the above plants are annual; they grow to a height varying from five to ten feet. The flowers vary from whitish yellow to a yellow colour. The capsules themselves are five-celled; but, while *capsularis* has no transverse partitions, *olitorius* has numerous transverse partitions between the seeds. The tap root of *capsularis* is thick and short, while that of *olitorius* is long and tapering.

*Corchorus capsularis* is much more largely grown than *corchorus olitorius*. The former, when grown up, can withstand water to a depth of twelve to eighteen inches; the latter cannot stand water-logging. Hence *capsularis* is very largely cultivated in low-lying land liable to floods, while *olitorius* is chiefly grown on higher land. Some of the varieties of each of the above two species have red stems and others green stems. It is generally believed that the fibre of *corchorus capsularis* is of a higher value than *corchorus olitorius*, and the red-stemmed varieties yield fibre inferior to that of the green-stemmed varieties.

#### SOIL.

Jute is a most accommodating crop, being capable of cultivation on almost any kind of soil. In Bengal it appears to grow and thrive on soil of almost any texture, varying from the heavy alluvial clay of low-lying "chars" and salty marshes to the sandy loams of the uplands. Its cultivation is, however, chiefly confined to the alluvial deposits at the mouths of the rivers; nevertheless, it may reasonably be expected to thrive in any fertile soil of fairly fine texture and good depth, provided that other conditions are favourable.

## RAINFALL.

Sufficient moisture without excessive rain and a high temperature, especially in the early part of the season, are necessary for successful cultivation. The idea is very commonly held that jute is a more or less aquatic plant, which will, like rice, thrive on submerged or swampy land throughout its period of growth. As a matter of fact, while some varieties will, when they have attained a certain degree of maturity, say three or four feet in height, grow in submerged land, the young plants and seedlings are, without doubt, very unfavourably affected by excessive moisture and water logging. Indeed, in suitable land, they are, perhaps, more capable of withstanding prolonged drought than too much rain without danger of their subsequent development. The most suitable distribution of rainfall is intermittent showers, gradually increasing in severity, resulting in a warm damp atmosphere; and, when the plants are well-established, they are able to withstand and take advantage of heavy rains and possible floods.

## METHOD OF CULTIVATION OF JUTE.

As the jute seed is small, and the young plant very tender, a deep and fine tilth is needed, and the land should be as free as possible from weeds. Of course the amount of preparation depends on the nature of the land, since a fine seed-bed is the object; heavy land requires more preparation than light land.

When the land has been prepared, the seed is sown broadcast, at the rate of about nine pounds to the acre. The sowing is carried out crosswise, *i.e.*, first from north to south and then from east to west, thus ensuring a fairly even distribution of the seed. After the sowing, the seed is harrowed in, and if the land has a tendency to harden on the surface after germination has taken place, it is a good thing to break the crust from time to time.

When the plants are about six inches high, it is necessary to thin them out to about six inches apart. The thinning has an important bearing on the out-turn. When the plants are too thickly crowded they grow up weak, and when too far apart they throw out a large number of branches and proportionately lose in height. Drilling

the seed in rows nine inches apart facilitates the operation of thinning, and also enables the crop to be kept free from weeds.

The crop occupies the ground for a period of about four months. It is hard to state the exact stage of growth at which the plants should be cut; but, for fibre, the jute should be harvested before it is dead ripe. If the plant is allowed to mature, the subsequent process of retting the plants for fibre is much retarded, and the fibre becomes coarse and rough, though it does not suffer in out-turn or strength. If, on the other hand, the crop is cut too early, the fibre, though glossy, becomes weak and the out-turn somewhat reduced. On the whole, opinion is in favour of harvesting when the fruit begins to form. The plants should be cut with a sickle just a little above the ground. They should be tied in bundles and allowed to lie out thus in the field for about two days, so that the leaves may wither and fall off. The leaves that remain on the stem should be shaken off before the plants are carried away to be retted; and, at the same time, the tops should be cut off with the sickle at the point where the plants bifurcate. The bundles should next be stacked preparatory to steeping. Bundles are best made about 8 ins. in diameter.

### RETTING.

After the bundles have been stacked in the fields for two or three days, they should be removed to be steeped or retted in water. The bundles are first placed upright in the water, about one or two feet deep, for a day or two. This is done because the lower portion of the stem rets more slowly than the upper. After this the bundles should be totally submerged. When steeping posts are generally erected on either side of the immersed stems, to keep them from floating away, the tops of the stems that have been cut off the plants and the dried leaves are then placed on top of the bundles to keep them submerged. Sods and earth are sometimes used for this purpose, but this is a bad plan, as it tends to make the water muddy; it is preferable to use logs of wood and weeds. The plants generally take from ten days to a month to ret, the period depending on the maturity of the plants, the temperature, the condition of the water, and the way in which the stems are immersed. After a



week or a fortnight, the bundles should be examined in order to ascertain how far the retting has advanced, and the examination should continue from time to time till it is found that the fibre comes off easily. Care must be taken that the stems are not allowed to remain too long under water, as over-retting produces a dirty dark colour, and also weakens the fibre.

The immersion of the plants in water induces fermentation, by which the fibrous tissues are softened and loosened. It is very essential, for the production of fibre of good colour, that steeping should be done in clear and sweet water. The retting is delayed in running water, as the washing effect of the water interferes with the fermentation. A running stream is, therefore, not suitable for retting; but, if possible, the water should not be entirely stagnant. The best results are obtainable in water that is just moving. Steeped in muddy or dirty water the fibre loses its lustre and assumes a greyish colour. Salt water delays the process.

### EXTRACTION AND WASHING OF FIBRE.

There are several methods of separating the fibre from the stem after the retting process is completed. The stalks are sometimes beaten against a platform till the pith-sticks within are removed. This process is not recommended, as the pith often gets broken and mixed up with the fibre, which itself gets notted, and has to be repicked. The simplest method, and one that has given quite satisfactory results when compared with others, is to strip off the fibre of each retted stem by hand and afterwards to wash it by swinging it round the head and threshing it on the surface of the water. The separated fibre should always be washed in clear water. When the washing is finished, the fibre should be left in the sun to dry for two or three days, after which it may be tied in bundles when it is practically ready for sale.

### INSECT PESTS.

In Bengal jute is attacked by caterpillars, and also by a cricket which bores into the ground and destroys the young plant by cutting the roots. During drought jute is also subject to blight.

## TRADE CONDITIONS.

Although the cultivation of jute has been much extended during recent years in India, the demand still continues very keen. It is usually made up in bales, weighing 400 lbs., for export.

### Manuring of Rhodesian Soils.

The following analyses of Rhodesian soils were sent to Professor Wyndham Dunstan, M.A., F.R.S., by the Director of Land Settlements for his advice as to the best means of improving them chiefly with respect to the growing of maize or mealies.

In his letter accompanying the memorandum Professor Dunstan says: "You will understand that it is extremely difficult on the statement of the results of chemical analysis alone to say definitely what the best mode of treatment will be, the memorandum should therefore be read in a general sense, and modifications made in the treatment suggested which may occur from local knowledge and experience of the soils in question.

"As much importance is now attached to the mechanical analysis of soil as to the determination of its chemical constituents. In these cases no mechanical analysis seems to have been made."

RED. . . . . Barratt (Sebakwe).

Moisture, 2.15%

Dried Soil.

|                                 | %     |
|---------------------------------|-------|
| Organic matter .....            | 3.99  |
| (Containing Nitrogen, 0.157).   |       |
| *Insoluble residue .....        | 85.12 |
| *Ferric Oxide and Alumina ..... | 9.73  |
| *Lime .....                     | 0.47  |
| *Magnesia .....                 | 0.31  |
| *Phosphoric Acid .....          | 0.06  |
| *Potash .....                   | 0.14  |
| *Undetermined .....             | 0.18  |

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100.00

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## Fertility or Solubility in 1% Citric Acid.

|                       | %      |
|-----------------------|--------|
| Phosphoric Acid ..... | 0'0077 |
| Potash .....          | 0'0069 |

\* ? Solubility in Hydrochloric Acid.

BLACK. Napier, Forage Side.

Moisture, 7'05%

| Dried Soil.          | %     |
|----------------------|-------|
| Organic matter ..... | 11'56 |

(Containing Nitrogen, 0'115).

|                                 |       |
|---------------------------------|-------|
| *Insoluble residue .....        | 62'02 |
| *Ferric Oxide and Alumina ..... | 22'37 |
| *Lime .....                     | 0'91  |
| *Magnesia .....                 | 0'97  |
| *Phosphoric Acid .....          | 0'08  |
| *Potash .....                   | 0'19  |
| *Undetermined .....             | 1'90  |

100'00

## Fertility or Solubility in 1% Citric Acid.

|                       | %       |
|-----------------------|---------|
| Phosphoric Acid ..... | 0'00925 |
| Potash .....          | 0'0116  |

\* ? Solubility in Hydrochloric Acid.

MEDIUM RED, NOT BLACK.

Napier I.

Moisture, 3'65%.

Dried Soil.

|                                 | %     |
|---------------------------------|-------|
| Organic Matter .....            | 13'54 |
| (Containing Nitrogen, 0'137).   |       |
| *Insoluble residue .....        | 62'78 |
| *Ferric Oxide and Alumina ..... | 18'78 |
| *Lime .....                     | 0'51  |
| *Magnesia .....                 | 0'62  |
| *Phosphoric Acid .....          | 0'05  |
| *Potash .....                   | 0'15  |
| *Undetermined .....             | 3'57  |

100'00



## Fertility or Solubility in 1% Citric Acid.

|                       | %       |
|-----------------------|---------|
| Phosphoric Acid ..... | 0'00226 |
| Potash .....          | 0'0135  |

## \* ? Solubility in Hydrochloric Acid.

RED.

## Napier II.

Moisture, 3'60%.

| Dried Soil.                      | %                  |
|----------------------------------|--------------------|
| Organic Matter .....             | 8'50               |
| (Containing Nitrogen, 0'101).    |                    |
| * Insoluble residue .....        | 68'23              |
| * Ferric Oxide and Alumina ..... | 20'09              |
| * Lime .....                     | 0'66               |
| * Magnesia .....                 | 0'62               |
| * Phosphoric Acid .....          | 0'06               |
| * Potash .....                   | 0'27               |
| * Undetermined .....             | 1'51               |
|                                  | <hr/> 100'00 <hr/> |

## Fertility or Solubility in 1% Citric Acid.

|                       | %      |
|-----------------------|--------|
| Phosphoric Acid ..... | 0'0101 |
| Potash .....          | 0'0033 |

## \* ? Solubility in Hydrochloric Acid.

DARK RED.

## Rhodes (Best).

Moisture, 4'75%.

| Dried Soil.                      | %                  |
|----------------------------------|--------------------|
| Organic Matter .....             | 7'26               |
| (Containing Nitrogen, 0'117).    |                    |
| * Insoluble residue .....        | 70'51              |
| * Ferric Oxide and Alumina ..... | 19'13              |
| * Lime .....                     | 1'31               |
| * Magnesia .....                 | 1'05               |
| * Potash .....                   | 0'16               |
| * Phosphoric Acid .....          | 0'06               |
| * Undetermined .....             | 0'52               |
|                                  | <hr/> 100'00 <hr/> |

## Fertility or Solubility in 1% Citric Acid.

|                           | %      |
|---------------------------|--------|
| Phosphoric Acid . . . . . | 0.0039 |
| Potash . . . . .          | 0.0340 |

\* ? Solubility in Hydrochloric Acid.

## MEMORANDUM ON SOILS FROM RHODESIA.

By Professor WYNDHAM DUNSTAN, M.A., F.R.S.,  
Director, Imperial Institute.

To determine the best method of treatment for improving the above five soils it will be sufficient to consider them primarily with respect to maize. Other crops may be grown in rotation.

Maize is one of the heaviest crops to grow, and requires a rich soil with regular dressings of manures and rotation with leguminous plants such as clover, lucerne, etc. The maximum average yield may be taken as 100 bushels per acre, or about 6,000 lbs., which corresponds to the highest figure given for Rhodesia. The ash of maize amounts to about 1.5 per cent., and this will contain about 50 per cent. of phosphoric acid and 25 per cent. of potash. There will also be a considerable amount of the latter in the plant. The seed alone of such a crop would therefore extract from the soil 53 lb. of phosphoric acid per acre, 20 lb. of potash, and 100 lb. of nitrogen.

For growing maize, therefore, the total phosphoric acid and potash in the soil should not be less than 0.1 per cent. of each constituent, and the available amount as given by a one per cent. solution of citric acid not less than 0.01 per cent. The application of manures should be made in order to bring the amounts up to this figure.

In the case of phosphoric acid there is generally a more or less definite ratio between the total and available amounts present in a given soil. The application of rock phosphates will increase both and produce permanent improvement in the soil. Where quick results are desired superphosphates may be used, but this is unsuitable if the soil has a tendency to sourness unless lime is used in conjunction.

In the case of potash, the total quantity is often high, whilst the available is low. This condition may generally be remedied by the addition of lime to the soil.

To renew or increase the amount of Nitrogen the method of rotation is universally adopted in growing maize. In America the best results are said to be obtained from growing clover, but other leguminous plants may be employed with advantage, and in the Transvaal peas, beans, lupines, vetches, clover, and lucerne are recommended. In many cases it is advisable to sow the leguminous crop immediately after the corn or other crop has been cut, and to break it up in the following spring or before the time for sowing the corn. This not only serves to store the nitrogen in the soil, but prevents washing during the rains, and when ploughed it improves the physical condition of both sandy and clay soils.

The treatment to be recommended for the five soils mentioned above can only be given in a general way, and may be followed out as improvement is realised.

#### NO. I., RED.—BARRATT (Sebakwe).

The analysis of this soil shows the following important figures:—

|                      | Total. | Available. | lb. per acre<br>in top 9 in.<br>of Soil. |
|----------------------|--------|------------|--|
| Lime .....           | 0'47   | ...        | ...                                      |
| Phosphoric Acid..... | 0'06   | 0'0077     | 192                                      |
| Potash.....          | 0'14   | 0'0069     | 172                                      |
| Nitrogen ...         | 0'157  | ...        | ...                                      |

The soil is probably a sandy loam, and the figures are not particularly low in either total or available plant constituents. The principal deficiency is in phosphoric acid, and the further impoverishment of the soil would be prevented by the yearly application of at least 100 lb. of rock phosphate per acre, or of an equivalent amount of other phosphatic manure, such as 2 cwt. of crushed bones. The application of lime should be attended with good results, and potash manures will be necessary after some further crops. Maize should be preceded by green manuring with lucerne or other suitable leguminous plant.



## No. II., BLACK NAPIER (Forage Side).

The analysis of this soil shows the following important figures:—

|                      | Total. | Available. | lb. per acre<br>in top 9in.<br>of Soil. |
|----------------------|--------|------------|---|
| Lime .....           | 0'91   | ...        | ...                                     |
| Phosphoric Acid..... | 0'08   | 0'00925    | 206                                     |
| Potash .....         | 0'19   | 0'116      | 290                                     |
| Nitrogen .....       | 0'115  | ...        | ...                                     |

This soil is no doubt a clay of rather a wet character. Both available potash and phosphoric acid are fairly high, but in spite of the large amount of organic matter, 11'56 (possibly including combined water), the total nitrogen is low. From the chemical analysis alone it is difficult to determine the best way to improve the soil. Many such soils have a tendency to become sour, and probably the best treatment would be the application of one to two tons of lime or crushed limestone per acre. Potash and phosphatic manures are not immediately required, but at least 1 cwt. per acre of the latter should be added when maize is to be grown. It will also be advisable to improve the nitrogen content by green manuring with lucerne.

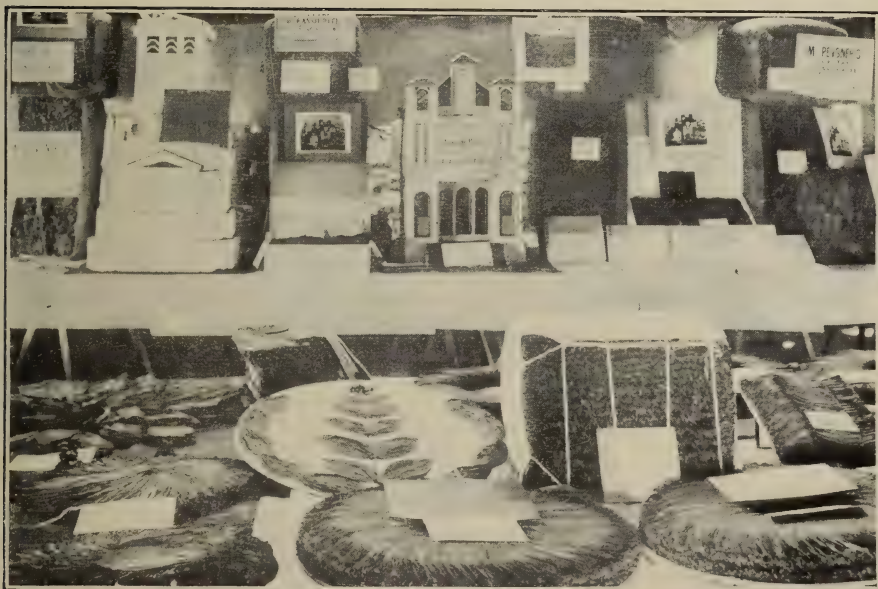
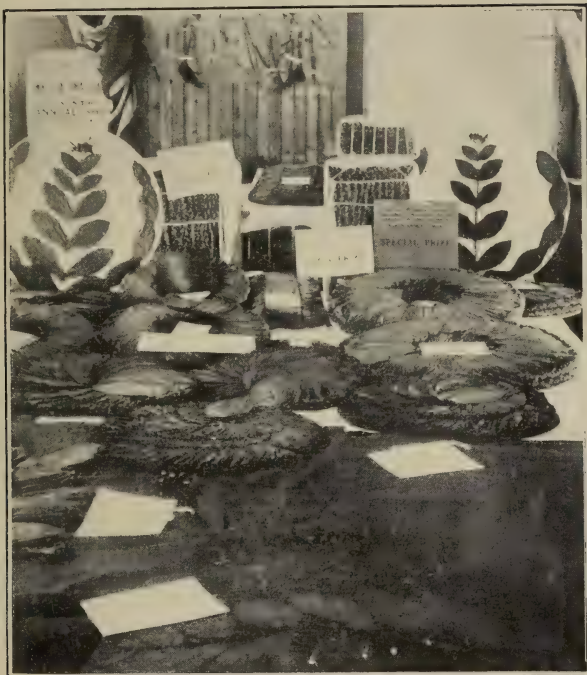
## No. III., DARK MEDIUM. NOT RED, NOT BLACK.

## Napier I.

The analysis of this soil shows the following important constituents:—

|                      | Total. | Available. | lb. per acre<br>in top 9in.<br>of Soil. |
|----------------------|--------|------------|---|
| Lime .....           | 0'51   | ...        | ...                                     |
| Phosphoric Acid..... | 0'05   | 0'000226   | 56                                      |
| Potash .....         | 0'15   | 0'135      | ...                                     |
| Nitrogen .....       | 0'137  | ...        | ...                                     |

The analysis indicates a clay soil or clay loam. It is deficient in lime and phosphoric acid, the available amount of the latter indicating a totally impoverished soil. Both potash and nitrogen are sufficiently high. Superphosphate and rock phosphate, to the amount of 1 cwt. of each per acre, should be applied, followed by yearly applications of 1 cwt. per acre. Free application of ground



Tobacco exhibits at the Salisbury Agricultural Show.





limestone should be made to the amount of 1 ton per acre, in order to increase gradually the amount to at least one per cent. If the soil is in good physical condition, ample repayment should be obtained in increased value of crops.

#### NO. IV., RED—NAPIER, II.

The analysis of this soil shows the following important constituents:—

|                      | Total. | Available. | lb. per acre<br>in top 9 in.<br>of Soil. |
|----------------------|--------|------------|--|
| Lime .....           | 0'66   | ...        | ...                                      |
| Phosphoric Acid..... | 0'06   | 0'101      | 252                                      |
| Potash .....         | 0'27   | 0'033      | 83                                       |
| Nitrogen .....       | 0'101  | ...        | ...                                      |

This analysis indicates a clay loam. It shows somewhat remarkable figures in having a comparatively high total potash, very little of which is in the available condition. The total phosphatic acid is on the other hand low, while the available amount is comparatively high.

Applications of from one to two tons of lime or crushed limestone per acre should be tried, and, if the crops respond, there probably will be no need of potash manures; otherwise it will be necessary to dress the land with sulphate or muriate of potash, to the amount of 1 to 2 cwt. per acre. The soil is not in immediate need of phosphoric acid, but this should be added, to the amount of 1 cwt. per acre, before raising heavy crops. The nitrogen is low, and should be augmented by green manuring with lucerne or other suitable crops. Nitrate of soda may also be used for growing corn or wheat as a top dressing to the amount of 100 lbs. to the acre.

#### NO. V., DARK RED—RHODES (Best).

The analysis shows the following important constituents:—

|                       | Total. | Available. | lb. per acre<br>in top 9 in.<br>of Soil. |
|-----------------------|--------|------------|--|
| Lime .....            | 1'31   | ...        | ...                                      |
| Potash .....          | 0'16   | 0'34       | 850                                      |
| Phosphoric Acid ..... | 0'06   | 0'039      | 95                                       |
| Nitrogen .....        | 0'117  | ...        | ...                                      |

The analysis indicates a somewhat clayey loam. The only marked feature of the soil above the others is the higher percentage of lime and available potash. These might be expected to correspond with one another. It has often been remarked that the application of potash to the soil is attended with good results for growing maize, and the high available potash in this soil may account for previous returns. It is, however, certain that the soil is greatly impoverished with respect to phosphoric acid, and to ensure a continuance of good yields this deficiency should be made good. Superphosphate would probably be the best manure for immediate use, and should be added to the amount of 1 cwt. to the acre, together with 1 cwt. of rock phosphate. The nitrogen is also low, and in order to retain the fertility of the soil, rotation with leguminous crops will have to be followed unless nitrogenous manures are applied.

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The review of the analyses of these soils shows that all are more or less deficient in lime and phosphoric acid for obtaining the best results. For clay soils the percentages of lime are much too low. It will be impossible to bring the soils to their maximum fertility, except after a number of seasons, but it should be possible to effect a gradual improvement, and thereby to obtain better crops. As lucerne promises well in Rhodesia, this may be found to be the most useful green manure to grow and plough in before sowing corn.

With reference to the quantities of manures that have been suggested, it must be pointed out that the minimum quantities are given, and that in this country (*i.e.* England) the dressings applied annually are very much larger. Owing to the cost for transport, and the more favourable conditions for rapid growth, the amounts given might be first tried. Where possible, or desirable, the quantity used may be increased to three or four cwt. per acre in the case of rock phosphate.

With reference to the most economical manures for transport, there is little doubt that the best quality of rock phosphate will be least expensive and most convenient. This variety contains the largest percentage of phosphoric acid of the manures on the market.

Of potash manures potassium muriate contains the largest percentage of potassium, and is also cheaper than the sulphate. This will, therefore, be the most economical salt to import into Rhodesia. There is, however, less need of potash manures at present for these soils.

Where it is desired, instead of adopting green manuring the nitrogen may be supplied in the form of sodium nitrate. It will, however, probably be found advantageous in many ways to adopt the method of green manuring, so much in vogue elsewhere.

The present market prices in this country of the the manures recommended are as follows:—

|                                 | Per Ton. |    |    |
|---------------------------------|----------|----|----|
|                                 | £        | s. | d. |
| Rock Phosphate (Florida) ... .. | 3        | 5  | 0  |
| Ditto (Christmas Is.) ... ..    | 3        | 8  | 0  |
| Potassium Muriate ... ..        | 8        | 10 | 0  |
| Sodium Nitrate ... ..           | 12       | 0  | 0  |
| Ammonium Sulphate ... ..        | 11       | 17 | 6  |

As far as possible local manures should be utilised. Bones may be crushed and used in place of rock phosphate, double the amount being required. All animal refuse may be used on the land as nitrogenous manure.

With respect to limestone, there is little information available, but samples received at the Imperial Institute show that crystalline limestones occur in Rhodesia. They are believed to occur in extensive formations of archæan age. If limestone is used it will be necessary to crush it to a coarse powder, or it may be burnt and slacked to a powder before being spread on the land.

Dr. Bernard Dyer reports on these soils as follows:—

I have carefully read the analyses which you sent me of the five soils.

The most striking point in all of them is their poverty in phosphoric acid, and especially in that portion of the phosphoric acid which is soluble in weak citric acid solution, and therefore to be regarded as the limit of the presently available phosphoric acid. There is no doubt at all that the following soils:—

- I. Barratt (Sebakwe).
- II. Napier—Forage Side.
- III. Napier I.
- V. Rhodes (Best).



are in immediate need of phosphatic manuring. The "Napier I." and "Rhodes (Best)" soils are in the most urgent need of such manuring.

The soil No. IV. ("Napier II.") is less needy than the others as regards phosphatic manure; but even this should be manured with phosphates if it is to do its best.

As regards potash, the soils No. II. ("Napier Forage Side") and No. III. ("Napier I.") probably contain a sufficiency of potash for cereal crops for the present; but, I should say, insufficient for tobacco culture. The soils No. I. ("Barratt, Sebakwe") and No. IV. ("Napier II.") are probably both in need of potash manuring.

The soil No. V. ("Rhodes—Best") contains an abundance of available potash, and will not need special potash manuring for some years to come.

All the soils are poor in nitrogen, and would need nitrogenous manuring if they are to do their best.

In the soil analyses given in the "Rhodesian Agricultural Journal" (Vol. III., page 643), I notice that, with only one exception, the available phosphoric acid is very low, but the available potash is, in the majority of cases, better than in the case of the soils the analyses of which I have been specially referring to. Generally speaking I should say that, when the available phosphoric acid is less than 0.01 per cent., the desirability of the immediate use of phosphates is indicated. It is less easy to define the limit of potash availability, but where the quantity falls below 0.01 per cent. I should be disposed to use potash salts for such crops as tobacco or potatoes, and when it falls to 0.05 for most crops.

As a general phosphatic dressing, I should recommend superphosphate, say 2 or 3 cwt. per acre of superphosphate, containing from 35 to 40 per cent. of soluble phosphate.

Potash, for most crops, is best applied in the form of sulphate of potash, say  $\frac{1}{2}$  cwt. per acre per year, or 1 cwt. per acre every other year. Where sulphate of potash is used it should be thoroughly mixed with the superphosphate.

Either nitrate of soda or sulphate of ammonia might be used as a nitrogenous manure. I should be inclined to prefer nitrate of soda to sulphate of ammonia wherever the soils are poor in lime, restricting the use of sulphate of ammonia to those soils which contain something like 1

per cent. of lime and upwards, as sulphate of ammonia has a tendency to exhaust the soil of lime if continuously used, and, whatever manure experiments are made with is likely to continue to be used. Nitrate of soda has the advantage of being suitable for any soil, whether rich or poor in lime, and possibly freight could be saved by shipping nitrate direct from Chili to South Africa. I think that you may take it that generally about  $1\frac{1}{4}$  cwt. of nitrate of soda will go about as far as 1 cwt. of sulphate of ammonia. I should think about 2 cwt. of nitrate of soda per acre would be a suitable nitrogenous dressing for ground nuts, fruit and potatoes. Beans and peas would, probably, require no nitrogenous dressing. Lucerne is grateful for nitrogenous manuring, but not dependent upon it. I should, however, recommend the trying of the effect of 1 to 2 cwt. of nitrate of soda per acre on lucerne, to see whether the increase in crop makes it worth while to apply it.

All of the crops just referred to might have the dressing of phosphates and potash salts that I have mentioned. With regard to tobacco I should make an exception; and, while giving the phosphatic manure in the form of superphosphates, as already suggested, should prefer to give potash, not in the form of sulphate of potash, but in the form of *nitrate of potash*, which latter (nitrate of potash) would be substituted for nitrate of soda, using, however, a little more of it, say  $1\frac{1}{4}$  cwt. of nitrate of potash in place of 1 cwt. of nitrate of soda. This would supply the nitrogen of the nitrate of soda and the potash of the sulphate of potash without the sulphuric acid of the latter or the soda of the former. A dressing of nitrate of soda and sulphate of potash is equivalent to a dressing of nitrate of potash and sulphate of soda. Now for tobacco-leaf an excess of soda and an excess of sulphuric acid are alike undesirable, as they tend to affect the burning quality of the leaf; so, for this crop alone, I should recommend nitrate of potash in place of nitrate of soda and sulphate of potash.

Professor Dunstan has either not been fully informed of the seasons in this country, or, when writing the memorandum was possibly thinking of American conditions when he recommended the sowing of leguminous crop directly after reaping the mealies, to be ploughed in the

following spring; in spite of this, however, his remarks on green manuring are of great value in showing the most economical means of providing the most expensive item of plant food, viz., Nitrogen, in which nearly all Rhodesian soils seem to be deficient, besides calling attention to the improvement of the physical condition of the soil through green manuring.

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## Farm Machinery.

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A certain amount of knowledge of machinery is most useful to all farmers. It is not only in his ability to work the farm machinery, to take it to pieces, repair, and put it together again, that the capable man shows his sagacity, it is also abundantly apparent in his manner of taking care of it. It is not the work in the field which destroys the machine as much as the destructive agencies which are at work when machinery is laid by in the off season. Then the dust and rust begin to do their work, wearing away the edge of the tool, corrugating smooth surfaces, and so on, so that by the time it is required for use again it often seems to have become quite unfitted for its purpose.

### TAKE THE CASE OF THE MOWER

used in the hayfield. How short a time during its existence is it actually in use. Only a few days every summer, and yet what is the average length of life of such an implement? This cannot be attributed to the actual amount of work which it has done, but rather to the want of proper care on the part of the owner. Instead of being taken home as soon as cutting is over, being oiled and put away carefully for another season, stress of work often induces the labourer to leave it standing in a corner of the field until haying is over, subjected to every change of wind and weather. And when haying is over harvest has begun, and still the machine stands in the same spot, looking forlorn and dilapidated. And, when at length it is taken home the mischief is done and half the life of the machine has oozed away. If it were not for the want of care displayed in the treatment of farm machinery the profits of the manufacturer would be seriously curtailed.



## STORING MACHINERY.

The first thing to see to is the provision of a proper water-tight shed for the machinery. Not such as is often met with, consisting of a few corrugated sheets of iron on top and the sides open to the weather, while all the farm poultry nestle in its cosy corners, but a sound weatherproof building. A cloth should be used as a covering from dust, and all the cutting parts of the machine should be first ground and then oiled and wrapped up. The bearings should be cleaned, and greased with a mixture of tallow and blacklead. Lastly, the machine should be protected from dust, and the poultry prevented from roosting in it. The same sort of attention is equally necessary in the case of plough, drill, and harrows. Nothing should be thought too unimportant to have every care allotted to it. It is well to paint the iron parts of the machine at the end of the season, and carefully to oil the woodwork. These precautions will very considerably lengthen the life of every implement, and thus reduce the outgoings, which are always a sufficiently large item on every farm. It is also a good thing to teach the younger members of the family as much as possible about the mechanism of every machine, so that their interest may be aroused, which will eventually bear good fruit. Farming is becoming year by year more scientific, and only the man who avails himself of every bit of useful information, who thinks for himself and puts his thoughts into practice, who strives to discover the why and wherefore of every procedure until he succeeds—only such a one will arrive at the same measure of success as he would have secured in any other sphere of life.

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## Orchard Management.

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The word orchard is very broad in its meaning, and will admit of further explanation. By orchard is meant a group of trees planted and cultivated for their fruit. Thus, there is an apple, peach, plum or pear orchard, and any other combination of fruit-producing trees that may be grown.

The site of the orchard is an important question, and is governed by conditions that prevail in certain localities.

The following points must be observed: Texture and kind of soil, supply of soil moisture or facility to irrigate, air and soil drainage, wind-breaks, direction of slopes and distance from large woods.

The above terms will need more explanation before they are of any practical value. There are many kinds of soil, and various fruit trees prefer their respective soils. Apples like a well-drained, deep rich soil, while pears prefer a more heavy clay loam, but like to be well-drained. Peaches do best in a well-drained, gravelly or decomposing rock soil with a deep subsoil. In choosing land, be sure not to have an ideal soil in one part of the orchard and a hard pan or impervious strata in another. If the soil is not rich, deep and satisfactory in every way do not use it for the purpose.

The air drainage of an orchard is very important; the cold air settles in the valley and low places, and if the orchard is in the warmer and circulating strata of air it will often escape frosts.

The wind-break has proved itself exceedingly useful, and there are many points in its favour. Some very good reasons for a wind-break may be stated thus:—

It protects from cold and hot wind, reduces evaporation of the soil, prevents breaking of trees by wind, lessens windfalls, protects blossoms, retains the loose surface soil, and is a home for beneficial birds. There are some objections to the wind-break, which, however, need to be spoken of here in order to place the wind-break in its proper relation to the orchard. If the fruit trees are too near it, the fruit will be poor in colour and generally covered with rust, and more or less infected with insects. The more natural forests are cleared away the more wind-breaks will the farmer be compelled to plant. It is not possible to change or control atmospheric conditions, but they can be moderated to a certain degree.

The exposure or aspect is determined by the direction and slope of the land. The temperature of the soil and air is greatly influenced by the aspect, and is a direct factor in growing the tender and early blooming varieties. If possible select a site that has a natural soil and air drainage. The excess of cold air and soil moisture must be carried from the orchard.

The soil must have a good supply of humus, and, if possible, some cover crop on it to be turned under. The



Maize judging at Salisbury Agricultural Show.





soil best adapted to general fruit culture may be classed or divided into gravelly loam, sandy loam, strong black loam and clay loam. Very light sandy soil, wet swamp and peat soil or dry sand, are generally to be avoided, although there are exceptions. A gravelly loam is a soil that contains gravel, but not to excess. A strong loam is a soil that is rich and contains just enough sand to make it loose and easily worked. Clay loam is usually a strong and deep soil, and contains just enough clay to make it more or less difficult to work. It is best to choose a soil rich in calcareous substances if the texture is good. The small fruits require a rich soil, and will do well almost on any soil that will produce first class farm crops. The first thing to do is to have the soil in a good state of cultivation, so that it can give up its plant food when applied, or that which it already contains. The soil should be tile-drained if not naturally, thoroughly fertilized, properly subsoiled, and put in the best possible shape before any trees are planted. If the soil is deep, the trees will go deep into it, and the root system will be out of the way of the plough. The manures should be incorporated in the soil immediately, and must be placed where the rootlets can use it, and not piled high about the trunks of the trees after they are planted.

The functions of drainage are many, but the following will give some of the most important reasons why land should be drained. Drainage removes the injurious salts in the earth which would accumulate in a soil with no natural or artificial drain. It removes water at those times when a surplus would be very injurious to plant life by excluding sufficient air. In our rainy season the surplus water must be carried off. In contrast to this, drainage enables the soil to hold more moisture in those times when it is most needed by the plants. In soils poorly drained the water table is near the surface, and hence the plants make a lateral shallow root growth. Later, when rains become less frequent, the water table or level falls, and the plants, owing to a poor root growth, suffer in time of drought. It deepens the soil and makes the capillary action greater, while it increases the amount of plant food by causing a larger amount of soil to give up its food when penetrated by the roots of plants. The lower the water table the more surface will the plants be able to utilise, as nitrification and those changes which unlock stored

plant food take place in well-ventilated soil. The physical condition of the soil is greatly improved by airing and facilitating chemical changes. The soil is made much warmer by the removal of surplus water, and the increased temperature has a beneficial influence on plant growth. Those small bacteria, which are so important, are able to do much more and faster work in soil that is well drained. Most land at the foot of hills is subject to ooze water, and the overflow of springs, etc., and hence will be much benefited by drainage. In the rainy season here may be seen land where the water table is visible above the surface, and it can readily be seen that such land needs drainage. Any land that will not shed its surface water in forty-eight hours after heavy rain needs drainage badly. Seeds often decay in poorly drained soil, and those that do succeed in germinating have very unfavourable conditions to contend with. A fair amount of moisture, air and favourable temperature are needed for plant growth. A certain amount of water is necessary in the soil, it must be understood, but the amount above what the plant requires must be carried off. The food of plants is in solution, and water is the medium in which it is carried from the crude state to the useful form. The soil particles are made much smaller by drainage, and thus the small delicate root hairs are enabled to pass among them and secure more food. The tips of roots and root hairs are acid, and have the power of unlocking plant food in the soil, and oxygen in sufficient amount is required among the particles in order for the rootlets to carry on their work. Crops are also of better quality, and the valuable constituents are increased. Among the most valuable ingredients may be mentioned starch, albuminoids and sugar. It must be remembered that all conditions support their respective plant life, *i.e.*, water-logged soil will support water-loving plants, and a well-drained soil will produce the more valuable ones.

Orchard cultivation is performed to better the mechanical condition and increase plant food. Tillage of the soil is to increase chemical changes. After the first cultivation of the season the soil is afterwards kept with a very fine dust mulch of three or four inches deep all summer. This is very instrumental in saving soil moisture. It is far better to have a small piece of land and keep it under high cultivation than to poorly care for a larger area.



The cover crop is coming into more favour each year. Many soils are losing their humus, through continued working and producing, and the cover crop is the ideal thing to restore them to their former condition. Before sowing a cover crop determine what results certain plants will bring about. If the trees need nitrogen, they will show it by having light green small foliage and a small wood growth. The best cover crop in this case would be any one of the leguminous plants. If your fruit lacks colour add potash, sow rape, and, if your soil needs some of the surplus water carried away, sow those plants that evaporate the greatest amount. The cover crop should be ploughed in before it becomes too abundant, as too much green vegetation does not decay rapidly, and tends to dry out the soil. The humus loosens the soil particles which, in turn, increases its water capacity. The humus is essential for the growth of the beneficial bacteria of the soil. One of the most important parts that a cover crop plays is its ability to change chemically the compounds in the soil and put them in an available form for the trees. The cover crop gathers, digests and turns over to the trees the plant food which it has stored.

The rotation of cover crops is earnestly advised. This is exceedingly important, and must be practised in order to furnish the trees with a balanced ration. When to change the crop will depend upon what the trees lack, as some orchards need more potash than nitrogen and *vice versa*. Some orchards will need only the humus supplied, and this is probably best furnished by rye. In all uses of a cover crop make it do a definite work. Never pasture the cover crop in the orchard, as the soil is often too wet to allow stock upon it, and the trees will appreciate all the food they can obtain.

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## **The Relative Value of Shelled Corn and Corn Meal for Fattening Pigs.**

### **SUMMARY OF TEN YEARS' FEEDING TRIAL AT THE WISCONSIN EXPERIMENT STATION.**

W. A. HENRY AND D. H. OTIS.

For the past ten years this Station has been testing the comparative value of whole corn and corn meal for fattening pigs. One or more tests have been made each

year. With the exception of one year, the corn was supplemented with wheat middlings, and, in one instance, also with skim milk. Experience teaches us that corn, either whole or ground, as an exclusive diet, gives unsatisfactory results with fattening swine.

The work for the past year was conducted in three series.

#### **FIRST FEEDING TRIAL OF THE YEAR.**

This consisted of twenty-four pigs, farrowed in July, August, and September, 1905, and averaging 68 pounds in weight when the trial began. Previous to the trial, these pigs were fed on skim milk, middlings, and a little corn. They were divided into two lots, as nearly equal as possible in regard to breed, age, weight, and condition.

Lot I contained six pure-bred Poland Chinas, five pure-bred Berkshires, and one cross-bred Poland-China-Berkshire. Seven were barrows and five sows.

Lot II consisted of six Poland-Chinas, four Berkshires, and two cross-bred Poland-China-Berkshires. Nine were barrows and three sows.

All lots were kept in pens, 10 feet by 12 feet in area, opening into small yards on the south, which were protected by the surrounding buildings. The pigs were fed in adjoining pens constructed for feeding purposes, and used only at meal times. The sleeping pens were kept well cleaned and well bedded. Both lots of pigs had free access to charcoal, wood ashes, and salt.

The experiment began January 20, 1906. Lot I was fed shelled corn and heavy wheat middlings, equal parts by weight, with two pounds of skim milk per head. The shelled corn was fed first, and after it was consumed, the mixed middlings and skim milk were fed as a slop. Lot II was fed the same ration, except that corn meal, made from the same lot of corn as was fed Lot I, was substituted for the shelled corn. The corn meal, wheat middlings, and skim milk were mixed together and fed as a slop. The water added in making the slop was slightly warmed. Each lot had its ration weighed out twice daily, and was given what it would eat. The corn used in these trials was a yellow dent, grown near Madison in 1905. The following analysis of this corn was made by the Chemical Department from samples submitted near the middle of the feeding period.

TABLE I.—Condition of the corn meal used in trials in feeding whole corn, in comparison with corn meal, to fattening pigs.

| Mechanical.<br>(Showing fineness of grinding).                             | Per<br>cent. | Chemical.                    | Per<br>cent. |
|--|--------------|------------------------------|--------------|
| Passed through sieve 20 meshes<br>to the inch ... ..                       | 19.0         | Moisture ... ..              | 13.95        |
| Passed through sieve 16 meshes<br>to the inch ... ..                       | 5.7          | Protein ... ..               | 9.13         |
| Passed through sieve 12 meshes<br>to the inch ... ..                       | 27.7         | Ether extract (fat) ... ..   | 3.2          |
| Passed through sieve 8 meshes<br>to the inch ... ..                        | 25.9         | Crude fibre ... ..           | 1.46         |
| Portion too coarse to pass<br>through sieve 8 meshes to the<br>inch ... .. | 21.7         | Nitrogen free extract ... .. | 70.65        |
|  | 100.00       | Ash ... ..                   | 1.55         |
|  |              |                              | 100.00       |

The pigs were weighed weekly. The feeding period lasted twelve weeks, and results obtained are recorded in the following tables:—



TABLE II.—Results of feeding whole corn, in comparison with corn meal, to fattening pigs.  
 LOT I.—Fed shelled corn, wheat middlings and skim milk.

|                                 | FEED EATEN.      |                     |               | S.*<br>300 | S.<br>319 | S.<br>320 | B.†<br>322 | S.<br>323 | B.<br>324 | B.<br>329 | B.<br>331 | S.<br>332 | B.<br>336 | B.<br>338 | B.<br>339 | Total. |
|---------------------------------|------------------|---------------------|---------------|------------|-----------|-----------|------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|--------|
|                                 | Shelled<br>corn. | Wheat<br>middlings. | Skim<br>milk. |            |           |           |            |           |           |           |           |           |           |           |           |        |
|                                 | Lbs.             | Lbs.                | Lbs.          | Lbs.       | Lbs.      | Lbs.      | Lbs.       | Lbs.      | Lbs.      | Lbs.      | Lbs.      | Lbs.      | Lbs.      | Lbs.      | Lbs.      | Lbs.   |
| Weight at beginning, January 20 | ...              | ...                 | ...           | 100        | 70        | 74        | 64         | 70        | 71        | 57        | 70        | 60        | 61        | 50        | 68        | 815    |
| Feed eaten and gain :           |                  |                     |               |            |           |           |            |           |           |           |           |           |           |           |           |        |
| 1st week                        | ...              | 125'0               | 168           | 4          | 5         | 7         | 11         | 8         | 5         | 6         | 5         | 7         | 7         | 7         | 4         | 76     |
| 2nd week                        | ...              | 129'2               | 168           | 8          | 7         | 6         | 10         | 8         | 9         | 6         | 6         | 4         | 6         | 7         | 9         | 86     |
| 3rd week                        | ...              | 157'0               | 155'0         | 12         | 9         | 8         | 5          | 7         | 10        | 7         | 3         | 10        | 8         | 7         | 9         | 95     |
| 4th week                        | ...              | 158'0               | 168           | 10         | 9         | 9         | 9          | 6         | 8         | 8         | 9         | 5         | 12        | 5         | 10        | 100    |
| 5th week                        | ...              | 180'0               | 168           | 13         | 11        | 12        | 15         | 11        | 14        | 10        | 9         | 10        | 11        | 10        | 10        | 136    |
| 6th week                        | ...              | 163'2               | 161           | 0          | -6        | 4         | 4          | 11        | 10        | 6         | 1         | 6         | 8         | 9         | 8         | 61     |
| 7th week                        | ...              | 169'7               | 168           | 14         | 12        | 10        | 12         | 9         | 13        | 7         | 9         | 12        | 10        | 8         | 9         | 125    |
| 8th week                        | ...              | 186'2               | 168           | 11         | 3         | 7         | 10         | 5         | 5         | 3         | 0         | 1         | 6         | 1         | 6         | 58     |
| 9th week                        | ...              | 201'2               | 168           | 13         | 8         | 13        | 10         | 6         | 3         | 12        | 8         | 9         | 14        | 14        | 10        | 120    |
| 10th week                       | ...              | 223'0               | 168           | 13         | 10        | 8         | 13         | 11        | 15        | 9         | 8         | 5         | 10        | 12        | 12        | 126    |
| 11th week                       | ...              | 233'2               | 168           | 14         | 9         | 8         | 8          | 7         | 11        | 9         | 5         | 12        | 7         | 7         | 8         | 105    |
| 12th week                       | ...              | 243'5               | 168           | 5          | 13        | 11        | 12         | 11        | 13        | 1         | 1         | 10        | 10        | 12        | 12        | 117    |
| Final weight                    | ...              | ...                 | ...           | 217        | 160       | 177       | 183        | 170       | 187       | 141       | 134       | 151       | 176       | 149       | 175       | 2020   |
| Feed eaten and gain             | 2,169'2          | 2,168'2             | 2,009         | 117        | 90        | 103       | 119        | 100       | 116       | 84        | 64        | 91        | 115       | 99        | 107       | 1,020  |

\*S—Sow. †B—Barrow.

TABLE III.—Results of feeding whole corn, in comparison with corn meal, to fattening pigs.  
 LOT II.—Fed corn meal, wheat middlings and skim milk.

|                                 | FEED EATEN.    |                     |               | S*<br>301 | B†<br>302 | B.<br>321 | B.<br>325 | B.<br>326 | B.<br>327 | B.<br>328 | B.<br>330 | B.<br>333 | B.<br>334 | S.<br>335 | S.<br>337 | Total. |
|---------------------------------|----------------|---------------------|---------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|--------|
|                                 | Corn,<br>meal. | Wheat<br>middlings. | Skim<br>milk. |           |           |           |           |           |           |           |           |           |           |           |           |        |
|                                 | Lbs.           | Lbs.                | Lbs.          | Lbs.      | Lbs.      | Lbs.      | Lbs.      | Lbs.      | Lbs.      | Lbs.      | Lbs.      | Lbs.      | Lbs.      | Lbs.      | Lbs.      | Lbs.   |
| Weight at beginning, January 20 | ...            | ...                 | ...           | 105       | 84        | 76        | 85        | 74        | 58        | 66        | 53        | 48        | 61        | 61        | 51        | 822    |
| Feed eaten and gain :           |                |                     |               |           |           |           |           |           |           |           |           |           |           |           |           |        |
| 1st week                        | 128'0          | 128'0               | 168           | 9         | 2         | 3         | 10        | 7         | 1         | 4         | 4         | 4         | 3         | 5         | 6         | 61     |
| 2nd week                        | 133'7          | 133'7               | 168           | 7         | 8         | 8         | 9         | 5         | 5         | 8         | 7         | 6         | 3         | 9         | 6         | 81     |
| 3rd week                        | 164'7          | 164'7               | 168           | 9         | 11        | 8         | 8         | 14        | 7         | 9         | 9         | 6         | 10        | 8         | 6         | 105    |
| 4th week                        | 161'0          | 161'0               | 168           | 10        | 15        | 10        | 12        | 7         | 8         | 11        | 8         | 9         | 8         | 3         | 7         | 108    |
| 5th week                        | 188'0          | 188'0               | 168           | 10        | 10        | 12        | 15        | 13        | 18        | 9         | 11        | 13        | 11        | 10        | 9         | 141    |
| 6th week                        | 187'5          | 187'5               | 161           | 10        | 10        | 11        | 4         | 6         | 5         | 12        | 7         | 3         | 4         | 0         | 7         | 78     |
| 7th week                        | 199'7          | 199'7               | 168           | 16        | 19        | 2         | 9         | 11        | 7         | 8         | 10        | 13        | 14        | 12        | 11        | 132    |
| 8th week                        | 211'7          | 211'7               | 168           | 9         | 14        | 15        | 10        | 6         | 8         | 9         | 8         | 6         | 8         | 4         | 2         | 95     |
| 9th week                        | 229'2          | 229'2               | 168           | 10        | 12        | 9         | 10        | 14        | 7         | 12        | 9         | 11        | 8         | 10        | 8         | 120    |
| 10th week                       | 240'7          | 240'7               | 168           | 10        | 9         | 15        | 15        | 9         | 10        | 12        | 6         | 10        | 10        | 9         | 4         | 119    |
| 11th week                       | 257'5          | 257'5               | 168           | 11        | 15        | 18        | 15        | 7         | 8         | 15        | 18        | 13        | 14        | 10        | 5         | 149    |
| 12th week                       | 271'2          | 271'2               | 168           | 15        | 11        | 9         | 6         | 7         | 8         | 8         | 11        | 11        | 9         | 9         | 5         | 199    |
| Final weight                    | ...            | ...                 | ...           | 231       | 220       | 106       | 208       | 180       | 153       | 183       | 161       | 153       | 165       | 154       | 116       | 2,120  |
| Feed eaten and gain             | 2,372'9        | 2,372'9             | 2,009         | 126       | 136       | 120       | 123       | 106       | 95        | 117       | 108       | 105       | 104       | 93        | 65        | 1,298  |

\*S—Sow. †B—Barrow.

A study of the results shows that :—

Lot I, fed shelled corn, wheat middlings, and skim milk, gained 1,205 pounds in weight, and consumed 4,337 pounds of grain and 2,000 pounds of skim milk. This lot required, therefore, 360 pounds of grain and 166 pounds of skim milk for each 100 pounds of gain made during the trial.

Lot II, fed corn meal, wheat middlings, and skim milk, gained 1,298 pounds in weight, and consumed 4,745 pounds of grain and 2,009 pounds of skim milk. This lot required 366 pounds of grain and 154 pounds of skim milk for each 100 pounds of gain made during the trial.

The lot fed corn meal consumed 408 pounds more grain, and gained 93 pounds more in weight than the lot fed shelled corn. It required 6 pounds more feed than the lot getting shelled corn, to make 100 pounds of gain.

## SECOND FEEDING TRIAL OF THE YEAR.

Ten pigs, varying considerably in age, weight, and condition, were divided as nearly equal as possible into two lots of five each. Those in Lot III varied from 70 to 272 pounds, the average weight at the beginning of the trial being 184 pounds. Lot IV varied from 89 to 268 pounds, the average weight being 175 pounds. Lot III contained one Duroc-Jersey, one Berkshire, and three Cross-bred Poland-China-Berkshires, of which four were barrows and one a sow. Lot IV contained two Berkshires, one Duroc-Jersey, and two Cross-bred Poland-China-Berkshires, all barrows.

Lot III was fed a grain mixture of two-thirds shelled corn and one-third heavy wheat middlings.

Lot IV was fed two-thirds corn meal and one-third heavy wheat middlings.

The methods of feeding, care, and management were the same as in the first trial. The results are recorded in the following tables :—



TABLE IV.—Results of feeding whole corn, in comparison to corn meal, to fattening pigs.

Lot III.—Fed shelled corn and wheat middlings.

|                             | FEED EATEN.      |                          | S.*<br>1996 | B.†<br>351 | B.<br>308 | B.<br>314 | B.<br>352 | Total. |
|-----------------------------|------------------|--------------------------|-------------|------------|-----------|-----------|-----------|--------|
|                             | Shelled<br>corn. | Wheat<br>midd-<br>lings. |             |            |           |           |           |        |
|                             | Lbs.             | Lbs.                     | Lbs.        | Lbs.       | Lbs.      | Lbs.      | Lbs.      | Lbs.   |
| Weight at beginning Jan. 20 | ...              | ...                      | 216         | 70         | 173       | 272       | 187       | 918    |
| Feed eaten and gain :       |                  |                          |             |            |           |           |           |        |
| 1st week ... ..             | 129.0            | 66.5                     | 9           | 4          | 7         | 11        | 11        | 42     |
| 2nd week ... ..             | 108.0            | 51.7                     | 5           | 5          | 3         | 11        | 2         | 26     |
| 3rd week ... ..             | 135.2            | 74.5                     | 10          | 4          | 6         | 16        | 10        | 46     |
| 4th week ... ..             | 131.7            | 62.0                     | 10          | 5          | 9         | 5         | 3         | 32     |
| 5th week ... ..             | 152.5            | 77.2                     | 10          | 9          | 14        | 20        | 13        | 66     |
| 6th week ... ..             | 139.0            | 67.2                     | 2           | 8          | 8         | 15        | 8         | 41     |
| 7th week ... ..             | 146.0            | 72.5                     | 18          | 10         | 15        | 12        | 13        | 68     |
| 8th week ... ..             | 147.2            | 72.5                     | —4          | 4          | 4         | 6         | 3         | 13     |
| 9th week ... ..             | 142.5            | 70.0                     | 5           | 10         | 7         | 15        | 10        | 47     |
| 10th week ... ..            | 157.7            | 78.2                     | 15          | 11         | 9         | 13        | 10        | 58     |
| 11th week ... ..            | 172.0            | 86.0                     | 4           | 15         | 14        | 16        | 14        | 63     |
| 12th week ... ..            | 169.5            | 84.7                     | 5           | 11         | 14        | 8         | 9         | 47     |
| Final weight...             | ...              | ...                      | 305         | 166        | 283       | 420       | 293       | 1,467  |
| Feed eaten and gain         | 1,725.3          | 863.0                    | 89          | 96         | 110       | 148       | 106       | 549    |

\* S—Sow. † B—Barrow.

TABLE V.—Results of feeding whole corn, in comparison with corn meal, to fattening pigs.

Lot IV.—Fed corn meal and wheat middlings.

|                             | FEED EATEN.   |                          | B.*<br>176 | B.<br>313 | B.<br>353 | B.<br>354 | B.<br>250 | Total. |
|-----------------------------|---------------|--------------------------|------------|-----------|-----------|-----------|-----------|--------|
|                             | Corn<br>meal. | Wheat<br>midd-<br>lings. |            |           |           |           |           |        |
|                             | Lbs.          | Lbs.                     | Lbs.       | Lbs.      | Lbs.      | Lbs.      | Lbs.      | Lbs.   |
| Weight at beginning Jan. 20 | ...           | ...                      | 220        | 268       | 89        | 93        | 205       | 875    |
| Feed eaten and gain :       |               |                          |            |           |           |           |           |        |
| 1st week ... ..             | 131.2         | 66.7                     | 12         | 16        | —7        | 2         | 8         | 31     |
| 2nd week ... ..             | 130.          | 65.                      | 9          | 13        | 15        | 4         | 14        | 55     |
| 3rd week ... ..             | 146.          | 78.                      | 6          | 9         | 8         | 9         | 10        | 42     |
| 4th week ... ..             | 159.5         | 79.7                     | 15         | 19        | 5         | 11        | 15        | 65     |
| 5th week ... ..             | 186.5         | 92.2                     | 17         | 14        | 12        | 11        | 18        | 72     |
| 6th week ... ..             | 171.5         | 85.7                     | 13         | 11        | 2         | 8         | 8         | 42     |
| 7th week ... ..             | 175.5         | 87.7                     | 14         | 25        | 11        | 15        | 22        | 87     |
| 8th week ... ..             | 177.          | 88.5                     | 9          | 5         | 6         | 5         | 6         | 31     |
| 9th week ... ..             | 180.          | 90.                      | 13         | 10        | 9         | 12        | 14        | 58     |
| 10th week ... ..            | 193.          | 96.5                     | 12         | 19        | 9         | 13        | 20        | 73     |
| 11th week ... ..            | 205.5         | 102.7                    | 20         | 19        | 10        | 17        | 18        | 84     |
| 12th week ... ..            | 210.          | 105.                     | 13         | 12        | 9         | 12        | 15        | 61     |
| Final weight...             | ...           | ...                      | 373        | 440       | 178       | 212       | 373       | 1,576  |
| Feed eaten and gain         | 2,065.7       | 1,032.7                  | 153        | 172       | 89        | 119       | 168       | 701    |

\* B—Barrow.

A comparison of the results shows that:—

Lot III, fed shelled corn and wheat middlings, gained 549 pounds, and consumed 2,588 pounds of grain, or 471 pounds of grain for 100 pounds of gain.

Lot IV, fed corn meal and wheat middlings, gained 701 pounds, and consumed 3,098 pounds of grain, or 442 pounds of grain for 100 pounds of gain.

The lot fed corn meal consumed 510 pounds more grain, and gained 152 pounds more in weight than the lot fed shelled corn. It produced 100 pounds of gain on 29 pounds less feed than did the lot fed shelled corn.

### THIRD FEEDING TRIAL OF THE YEAR.

The comparative value of shelled corn, versus corn meal, was further tested during the summer of 1906 with hogs running on Dwarf Essex rape pasture. Twelve pigs, farrowed in August and September, 1905, and averaging 190 pounds in weight, were divided into two lots as nearly equal as possible as to breed, age, sex, weight, and condition.

Lot V contained four Poland-Chinas and two Berkshires, of which four were barrows and two sows.

Both lots were provided with an abundance of Dwarf Essex rape pasture and fresh water.

Lot VI contained five Poland-Chinas and one Berkshire, of which four were barrows and two sows.

Lot V was fed shelled corn and heavy wheat middlings. The wheat middlings was supplied as a thick slop, and after it was consumed, the shelled corn was scattered in the feed trough and on the feeding platform, where the pigs ate it leisurely.

Lot VI was supplied corn meal and wheat middlings, mixed together, and fed as a thick slop. Both lots were supplied with wood ashes and salt *ad libitum*, and had access to plenty of shade. During a few days the pigs suffered from the extreme heat. Wallows were provided, however, for each pen, and on the hotter days, they were allowed to spend a few hours in a running brook near the pens.

Both lots were fed twice daily. The feed was weighed at the beginning of each week, and what was left over was weighed back at the end of the week. Each pig was weighed weekly. The results are given in the following tables:—

TABLE VI.—Results of feeding whole corn, in comparison with corn meal, to fattening pigs.

Lot V.—Fed shelled corn, wheat middlings, and Dwarf Essex rape.

|                            | FEED EATEN.   |                  | B.*  | S.†  | S.   | B.   | B.   | B.   | Total |
|----------------------------|---------------|------------------|------|------|------|------|------|------|-------|
|                            | Shelled corn. | Wheat middlings. | 334  | 335  | 320  | 330  | 325  | 324  |       |
|                            | Lbs.          | Lbs.             | Lbs. | Lbs. | Lbs. | Lbs. | Lbs. | Lbs. | Lbs.  |
| Weight at beginning July 3 | ...           | ...              | 182  | 156  | 192  | 167  | 225  | 210  | 1,132 |
| Feed eaten and gain:       |               |                  |      |      |      |      |      |      |       |
| 1st week                   | 100           | 50               | 7    | 7    | 7    | 4    | 7    | 8    | 40    |
| 2nd week                   | 150           | 75               | 13   | 4    | 3    | 6    | 10   | 10   | 46    |
| 3rd week                   | 150           | 75               | 10   | 3    | 14   | 9    | 10   | 14   | 60    |
| 4th week                   | 150           | 75               | 6    | 5    | 4    | 5    | 6    | 6    | 32    |
| 5th week                   | 150           | 75               | 16   | 15   | 14   | 20   | 17   | 16   | 98    |
| 6th week                   | 200           | 100              | 9    | 0    | 11   | 6    | 4    | 7    | 37    |
| 7th week                   | 200           | 100              | 7    | 9    | 11   | 10   | 14   | 9    | 60    |
| 8th week                   | 200           | 100              | 5    | 8    | 11   | 10   | 13   | 11   | 58    |
| 9th week                   | 200           | 100              | 10   | 6    | 13   | 14   | 13   | 23   | 59    |
| 10th week                  | 220           | 110              | 11   | 0    | 20   | 13   | 13   | 11   | 68    |
| 11th week                  | 235           | 115              | 12   | 1    | 5    | 14   | 18   | 12   | 62    |
| 12th week                  | 235           | 115              | 1    | 9    | 15   | 13   | 14   | 19   | 71    |
| 13th week                  | 235           | 115              | 16   | 4    | 10   | 7    | 8    | 5    | 50    |
| Total                      | ...           | ...              | 285  | 227  | 330  | 298  | 372  | 361  | 1,873 |
| Feed eaten and gain        | 2,425         | 1,205            | 103  | 71   | 138  | 131  | 147  | 151  | 741   |

TABLE VII.—Results of feeding whole corn, in comparison with corn meal, to fattening pigs.

Lot VI.—Fed corn meal, wheat middlings, and Dwarf Essex rape.

|                            | FEED EATEN. |                  | B.*  | B.   | B.   | B.   | S.†  | S.   | Total |
|----------------------------|-------------|------------------|------|------|------|------|------|------|-------|
|                            | Corn meal.  | Wheat middlings. | 333  | 320  | 321  | 230  | 323  | 319  |       |
|                            | Lbs.        | Lbs.             | Lbs. | Lbs. | Lbs. | Lbs. | Lbs. | Lbs. | Lbs.  |
| Weight at beginning July 3 | ...         | ...              | 167  | 196  | 203  | 201  | 193  | 183  | 1,143 |
| Feed eaten and gain:       |             |                  |      |      |      |      |      |      |       |
| 1st week                   | 100         | 50               | 8    | 10   | 17   | 10   | 13   | 7    | 65    |
| 2nd week                   | 150         | 75               | 12   | 31   | 18   | 18   | 7    | 8    | 76    |
| 3rd week                   | 150         | 75               | 8    | 14   | 5    | 3    | 10   | 9    | 49    |
| 4th week                   | 150         | 75               | 4    | 9    | 8    | 10   | 6    | 5    | 42    |
| 5th week                   | 150         | 75               | 15   | 15   | 12   | 13   | 11   | 10   | 76    |
| 6th week                   | 200         | 100              | 6    | 4    | 7    | 10   | 10   | 13   | 50    |
| 7th week                   | 200         | 100              | 14   | 14   | 13   | 15   | 10   | 8    | 74    |
| 8th week                   | 200         | 100              | 17   | 17   | 14   | 17   | 11   | 10   | 86    |
| 9th week                   | 200         | 100              | 1    | 13   | 15   | 13   | 16   | 12   | 70    |
| 10th week                  | 220         | 110              | 12   | 10   | 4    | 3    | 9    | 5    | 43    |
| 11th week                  | 235         | 115              | 17   | 14   | 19   | 20   | 4    | 8    | 82    |
| 12th week                  | 235         | 115              | 16   | 17   | 14   | 7    | 16   | 17   | 87    |
| 13th week                  | 235         | 115              | 9    | 15   | 23   | 21   | 24   | 17   | 109   |
| Total                      | ...         | ...              | 306  | 361  | 372  | 361  | 340  | 312  | 2,052 |
| Feed eaten and gain        | 2,425       | 1,205            | 139  | 165  | 169  | 160  | 147  | 129  | 909   |

\* B.—Barrow. † S.—Sow.



In the above trial, Lot V, fed shelled corn and wheat middlings, with access to rape pasture, gained 741 pounds, and consumed 3,630 pounds of grain, or 490 pounds of grain for 100 pounds of gain. As the table shows, sow 335 made poor gains. Although the lightest pig in the bunch, she was apparently in good, thrifty condition at the beginning of the experiment. As the feeding progressed, she was taken lame in her feet, her appetite was poor, and her weekly gains were correspondingly small. Had she gained proportionately with the others, the total gain of the lot would have been 63 pounds greater.

Lot IV, fed corn meal and wheat middlings, with access to rape pasture, gained 909 pounds, and consumed 3,630 pounds of grain, or 399 pounds of grain for 100 pounds of gain.

The lot getting corn meal consumed the same number of pounds of grain, but gained 168 pounds more than the shelled corn lot, producing a 100 pounds of gain on 91 pounds less feed than the lot getting shelled corn.

## SUMMARY OF FEEDING TRIALS AT THIS STATION, COVERING A PERIOD OF TEN YEARS, IN WHICH ONE LOT OF FATTENING PIGS RECEIVED SHELLED CORN, AND ANOTHER CORN MEAL.

For the past ten years, this Station has been testing the value of feeding whole corn, in comparison with corn meal, as the main portion of the ration, for fattening pigs. During this period, eighteen trials have been made, and the results published from year to year. The work of the past year, with a summary for the entire period, will complete the work of comparing whole corn with corn meal for fattening pigs, so far as this Station is concerned.

In this experiment it has been the aim to use sufficient animals and to extend the feeding trials through a series of years, in order to make the results reliable and reasonably conclusive. The 280 pigs used in this experiment belonged to various breeds, cross-breeds, and grades, as follows: Poland-China, 91; Berkshire, 52; Duroc-Jersey, 2; Yorkshire, 2; grade Poland-China, 2; grade Berkshire, 11; grade Chester White, 13; cross-bred Poland-China-Berkshire, 65; cross-bred Poland-China-Chester White, 25; Razor-back, 6; cross-bred Poland-China-

Razor-back, 5; cross-bred Berkshire-Razor-back, 6. The various breeds, cross-breeds, and grades were divided equally among the lots receiving shelled corn and the lots receiving corn meal.

The corn used in the experiment was, with one exception, over a year old. For six years corn was imported from Iowa. For three years old Wisconsin corn was used. During the last year, 1906, corn was secured near Madison, grown the same year. The results obtained with shelled corn cannot, therefore, be attributed to the use of soft corn.

The following table furnishes a summary of the trials from year to year and the totals and averages for the entire period.

The table shows that, in the ten years covered by the experiment, eighteen trials were made with a total of 280 pigs, one-half of this number receiving shelled corn as the principal portion of the ration, and the other half corn meal.

The feed required to produce 100 pounds of gain varied from 360 to 820 pounds. The poorest gains for feed consumed were made in Trial 14, where corn alone was fed to young pigs averaging 84 pounds in weight at the beginning of the trial. This emphasizes what is a common experience among hog raisers, that an exclusive diet of corn is not desirable with any class of hogs, and is especially to be avoided with young pigs. The evil effects of this kind of a ration were shown in the decreased thrift, appetite, and gains, and in the large amount of feed required to produce a 100 pounds of gain.

The best gains for feed consumed were made with young pigs in Trial 16, where the grain, consisting of equal parts, by weight, of corn and middlings, was supplemented with a small allowance of skim milk. The pig feeder is warranted, not only in using a variety of grains, but will find it to his advantage to add skim milk to the ration whenever he can get it.

The totals and averages for the ten years show that the 140 pigs receiving shelled corn as the principal ration ate 46,736 pounds of shelled corn and 22,590 pounds of wheat middlings, or a total of 69,326 pounds of grain, on which they made 13,828 pounds of gain.

TABLE VIII.—Result of ten years' experiment in feeding shelled corn, in comparison with corn meal, to fattening pigs.

| Year. | Trial. | Lot receiving— | Number of pigs in experiment. | Average weight per head at beginning of experiment. | Length of feeding period. | Feed Eaten.   |            |                  | Gains of lots. | Feed consumed per 100 pounds of gain for lots receiving. |            | Economy of grinding expressed in per cent. |         |
|-------|--------|----------------|-------------------------------|---|---------------------------|---------------|------------|------------------|----------------|--|------------|--|---------|
|       |        |                |                               |   |                           | Shelled Corn. | Corn meal. | Wheat middlings. |                | Shelled corn.  | Corn meal. | Gained.                                    | Lost.   |
| 1896  | 1      | Shelled corn   | 9                             | 354   | Days, 70                  | Lbs. 5,314    | Lbs. ..    | Lbs. 633         | Lbs. 1,235     | Lbs. 481   | Lbs. ..    | Lbs. ..                                    | Lbs. .. |
|       |        | Corn meal      | 9                             | 346   | 70                        | ..            | 5,333      | 653              | 1,348          | ..   | 442        | 80   | ..      |
|       | 2      | Shelled corn   | 10                            | 225   | 70                        | 3,960         | ..         | 705              | 789            | 591  | ..         | ..   | ..      |
|       |        | Corn meal      | 10                            | 223   | 70                        | ..            | 4,537      | 699              | 1,076          | ..   | 487        | 176  | ..      |
| 1897  | 3      | Shelled corn   | 9                             | 212   | 84                        | 3,284         | ..         | 1,042            | 984            | 501  | ..         | ..   | ..      |
|       |        | Corn meal      | 9                             | 210   | 84                        | ..            | 3,971      | 1,085            | 1,348          | ..   | 442        | 117  | ..      |
|       | 4      | Shelled corn   | 7                             | 183   | 63                        | 1,170         | ..         | 1,170            | 552            | 424  | ..         | ..   | ..      |
|       |        | Corn meal      | 7                             | 198   | 63                        | ..            | 1,330      | 1,330            | 576            | ..   | 462        | ..   | 89      |
| 1898  | 5      | Shelled corn   | 8                             | 184   | 84                        | 2,758         | ..         | 1,379            | 830            | 500  | ..         | ..   | ..      |
|       |        | Corn meal      | 8                             | 187   | 84                        | ..            | 3,132      | 1,566            | 992            | ..   | 473        | 54   | ..      |
|       | 6      | Shelled corn   | 8                             | 184   | 84                        | 2,609         | ..         | 1,304            | 799            | 480  | ..         | ..   | ..      |
|       |        | Corn meal      | 8                             | 184   | 84                        | ..            | 3,078      | 1,539            | 1,030          | ..   | 448        | 83   | ..      |
| 1899  | 7      | Shelled corn   | 10                            | 186   | 84                        | 7,084         | ..         | 3,542            | 2,136          | 497  | ..         | ..   | ..      |
|       |        | Corn meal      | 10                            | 186   | 84                        | ..            | 7,106      | 3,598            | 2,132          | ..   | 507        | ..   | 20      |
|       | 8      | Shelled corn   | 14                            | 174   | 98                        | 5,852         | ..         | 2,926            | 1,571          | 559  | ..         | ..   | ..      |
|       |        | Corn meal      | 14                            | 175   | 98                        | ..            | 6,183      | 3,092            | 1,938          | ..   | 479        | 143  | ..      |



| 1901     | 9  | Shelled corn | .. | .. | .. | .. | 12  | 145 | 84 | 3,504              | ..                 | 1,752  | 803    | 588 | ..  | ..   | ..   |
|----------|----|--------------|----|----|----|----|-----|-----|----|--------------------|--------------------|--------|--------|-----|-----|------|------|
|          |    | Corn meal..  | .. | .. | .. | .. | 12  | 148 | 84 | ..                 | 3,831              | 1,914  | 1,038  | ..  | 553 | 6.0  | ..   |
|          | 10 | Shelled corn | .. | .. | .. | .. | 3   | 70  | 84 | 519                | ..                 | 510    | 234    | 444 | ..  | ..   | ..   |
|          |    | Corn meal..  | .. | .. | .. | .. | 3   | 72  | 84 | ..                 | 480                | 489    | 218    | ..  | 449 | ..   | 1.1  |
| 1902     | 11 | Shelled corn | .. | .. | .. | .. | 3   | 80  | 84 | 452                | ..                 | 452    | 169    | 594 | ..  | ..   | ..   |
|          |    | Corn meal..  | .. | .. | .. | .. | 3   | 80  | 84 | ..                 | 480                | 480    | 166    | ..  | 579 | 2.5  | ..   |
|          | 12 | Shelled corn | .. | .. | .. | .. | 3   | 133 | 91 | 713                | ..                 | 713    | 255    | 559 | ..  | ..   | ..   |
|          |    | Corn meal..  | .. | .. | .. | .. | 3   | 134 | 91 | ..                 | 703                | 703    | 274    | ..  | 513 | 8.2  | ..   |
|          | 13 | Shelled corn | .. | .. | .. | .. | 4   | 126 | 70 | 1,139              | ..                 | ..     | 208    | 548 | ..  | ..   | ..   |
| 1904     |    | Corn meal..  | .. | .. | .. | .. | 4   | 127 | 70 | ..                 | 1,408              | ..     | 246    | ..  | 572 | ..   | 4.3  |
|          | 14 | Shelled corn | .. | .. | .. | .. | 3   | 83  | 70 | 443                | ..                 | ..     | 60     | 738 | ..  | ..   | ..   |
|          |    | Corn meal..  | .. | .. | .. | .. | 3   | 84  | 70 | ..                 | 582                | ..     | 71     | ..  | 820 | ..   | 11.1 |
| 1905     | 15 | Shelled corn | .. | .. | .. | .. | 5   | 139 | 98 | 1,616              | ..                 | 1,617  | 618    | 523 | ..  | ..   | ..   |
|          |    | Corn meal..  | .. | .. | .. | .. | 5   | 145 | 98 | ..                 | 1,530              | 1,530  | 530    | ..  | 577 | ..   | 10.3 |
|          | 16 | Shelled corn | .. | .. | .. | .. | 12  | 68  | 84 | 2,160 <sup>b</sup> | ..                 | 2,168  | 1,205  | 300 | ..  | ..   | ..   |
|          |    | Corn meal..  | .. | .. | .. | .. | 12  | 68  | 84 | ..                 | 2,373 <sup>b</sup> | 2,373  | 1,298  | ..  | 366 | ..   | 1.6  |
| 1906     | 17 | Shelled corn | .. | .. | .. | .. | 5   | 184 | 84 | 1,725              | ..                 | 863    | 549    | 471 | ..  | ..   | ..   |
|          |    | Corn meal..  | .. | .. | .. | .. | 5   | 175 | 84 | ..                 | 2,066              | 1,033  | 701    | ..  | 442 | 6.1  | ..   |
|          | 18 | Shelled corn | .. | .. | .. | .. | 6   | 189 | 91 | 2,425              | ..                 | 1,205  | 741    | 490 | ..  | ..   | ..   |
|          |    | Corn meal..  | .. | .. | .. | .. | 6   | 190 | 91 | ..                 | 2,425              | 1,205  | 909    | ..  | 399 | 18.5 | ..   |
| Totals.. |    | Shelled corn | .. | .. | .. | .. | 140 | ..  | .. | 46,736             | ..                 | 22,590 | 13,828 | ..  | ..  | ..   | ..   |
|          |    | Corn meal..  | .. | .. | .. | .. | 140 | ..  | .. | 50,647             | ..                 | 24,189 | 15,891 | ..  | ..  | ..   | ..   |
| Averages |    | Shelled corn | .. | .. | .. | .. | 8   | 175 | 82 | 2,596              | ..                 | 1,255  | 768    | 501 | ..  | ..   | ..   |
|          |    | Corn meal..  | .. | .. | .. | .. | 8   | 175 | 82 | ..                 | 2,813              | 1,344  | 883    | ..  | 471 | 6.0  | ..   |

<sup>a</sup> Fed 2,000 pounds of skim milk in addition to grain ration.

The 140 pigs receiving corn meal as the principal ration ate 50,647 pounds of corn meal and 24,189 pounds of wheat middlings, or a total of 74,836 pounds of grain, on which they made 15,891 pounds of gain.

The 140 pigs receiving the corn meal ate 5,510 pounds more grain and made 2,036 pounds more gain than the 140 pigs receiving shelled corn.

The pigs receiving the shelled corn consumed an average of 501 pounds of grain for each 100 pounds of gain.

The pigs receiving the corn meal consumed an average of 471 pounds of grain per 100 pounds of gain, thus producing 100 pounds of gain on 30 pounds less grain than the pigs receiving shelled corn.

In the eighteen trials there were eleven which showed a saving by grinding, the amount saved varying from 2.5 per cent. in Trial 11, to 18.5 per cent. in Trial 18. There were seven trials where there was a loss from grinding, the amount lost varying from 1.1 per cent., in Trial 10, to 11.1 per cent. in Trial 14.

The average of the eighteen trials shows a saving from grinding corn of 6 per cent.

By taking the average gain per pig of both lots in each trial and counting the number of pigs that gained more than the average, and those gaining less than the average, it was found that, with the lots receiving shelled corn as its principal ration, there were 45 pigs that gained more than the average, and 95 pigs that fell below the average.

With the lots receiving corn meal as its principal ration there were 91 pigs that gained more than the average, and 49 that fell below the average.

The economy of grinding corn will depend on the price of corn and the cost of grinding. With an average saving of 6 per cent. by grinding corn, the following table is constructed to assist the farmer in determining when to grind.

TABLE IX.—Saving effected per bushel by grinding corn for fattening pigs.

|                    |     | Cts. | Cts. | Cts. | Cts. | Cts. |     |     |     |     | Cts. | Cts. |
|--------------------|-----|------|------|------|------|------|-----|-----|-----|-----|------|------|
| When corn is worth | ... | 25   | 30   | 35   | 40   | 45   | 50  | 55  | 60  | 65  | 70   | 75   |
| Saved by grinding  | ... | 1.5  | 1.8  | 2.1  | 2.4  | 2.7  | 3.0 | 3.3 | 3.6 | 3.9 | 4.2  | 4.5  |

The table shows that when corn is worth 25 cents. per bushel, the saving from grinding is only 1.5 cents, not enough to cover the cost unless cheap power is available.



S.A Bred Stallion belonging to Mr. Malan.



Imported Mare belonging to Mr. Yates.





As corn advances in price the saving per bushel increases three-tenths of a cent. with each five cents' advance. With corn at 75 cents. per bushel, the saving from grinding is 4.5 cents. per bushel.

Where there is plenty of time for maturing the pigs, and it is not necessary to secure the maximum daily gain, it is doubtful if it pays to grind corn for pigs.

The test shows that where quick maturity is an important item, better results are secured from the corn meal. Pigs fed corn meal, eat more grain and make somewhat larger daily gains.

Corn meal can doubtless be used to good advantage in finishing off a bunch of hogs which were at first fed shelled corn. Changing over to corn meal near the close of the feeding period also furnishes a change in the character of the ration, which will be satisfactory to the animals.

These are conditions and circumstances where it is not advisable to grind the corn even though the corn be high priced. On the other hand, when fitting hogs for show, sale, or in high pressure feeding for market, the feeder will consider it advisable to grind the corn, even though it is expensive to do so. The feeder, knowing these results, will use them to suit his own conditions.

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## Canadian Bacon Industry.

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The following short note on the Canadian Bacon Industry will be of interest. The bulk of the bacon imported to England comes from the province of Ontario, where a discussion has been going on for some time as to the advisability of giving up the breeding of the bacon pig and going in more for fat pork. An extensive inquiry which has been made into the condition of the industry, however, has brought out the fact that during last year not only were 2,266,683 pigs killed in Ontario, but that throughout the province the evident tendency is to produce more and more pigs of the approved bacon type, by the use of pure bred sires and crosses. Yorkshire pigs hold

the chief positions in 33 out of 42 counties, while in seven others they tie with some other breed for first place. Berkshires come next, being the principal breed in one county, and tying for first place in seven others. While all crosses are used, the report states, there is no doubt that the most popular cross throughout the province is that between the Yorkshires and Berkshires, a cross excellent for bacon purposes. While the Yorkshires are increasing in the greatest numbers, the Berkshires show the greatest percentage gain. Pure-bred sires are used almost entirely in 25 per cent. of the counties, while in another 20 per cent. grade sires are only used to a limited extent. The general tendency throughout the province is to slightly increase production, but considerable caution is observed among many individual breeders and feeders not to go into the business too extensively, for fear that over-production might bring prices down to an unprofitable point.

## ONE OR TWO OTHER POINTS

were brought out by the inquiry, one of which was that in an ordinary season the average number of young pigs to reach the weaning age is 7.77 per litter, but that, owing to larger losses this spring, the number this year is only 7.61. The cost of feeding bacon pigs, on the average of the entire province, is given at 18s. 9½d. per cwt. (100 lbs.) for summer feeding, and 22s. 5d. per cwt. for winter feeding. But it is pointed out that in very few cases did the correspondents state whether their figures were estimates or the results of experiments. In a small number of cases, however, it is stated that the figures given are the result of experiments on the matter, and it is noted that in all these cases the figures are lower than the average ones, and for both summer and winter feeding alike. A number of correspondents, chiefly in Western Ontario, state that with comfortable quarters and roots the cost of feeding is no greater in winter than in summer. It will be seen from the figures quoted at the beginning of this article that our own imports bear out the conclusions of this inquiry as to increased bacon production. Our supplies from Canada have shown important increases for some three years past.



## **Weak Bone in Pigs.**

Pig-breeders have it in their power to produce pigs with strong or weak bones, and the strength depends very much on the breeding and feeding of the animals. When heavy hogs are raised, they frequently break down at the pasterns, or seem to be suffering from paralysis or kidney disease; and those who keep heavy breeding sows are troubled with serious losses from the same causes. In the case of sows, breaking down is most common at the time of farrowing or soon afterwards, and it is often serious enough to cause the sow to lie on her young and kill them, so helpless does she become.

### **CAUSES OF WEAK BONES.**

Recent inquiries into the causes of breakdowns in pigs, which have been made by experiment stations in the United States, go to show that ailments which are frequently believed to be paralysis or kidney disease are really due to weak bones, and that in very many instances the bones are actually fractured. An instance is related of two sows which were running in a large yard, with six-weeks-old pigs, where there was no possibility of an accident, or nothing whatever to cause a fall, suddenly breaking a thigh bone each, and having had to be slaughtered. The two cases of breakdown occurred within a week of each other, and post-mortem examination revealed a weak and softened condition of the bones of the legs, although the general appearance of the animals previously showed no indication of any weakness. A somewhat similar case was some time since reported by a veterinary surgeon of Franklinville, N.Y., who was called to examine a lot of six-months-old pigs suffering from lameness. These were perfectly well and sound when farrowed, and seemed to thrive well up to the time of weaning and afterwards, on a dietary of meals, but without milk. When about five months old they developed signs of lameness, and were treated for paralysis by the owner. A month later, when the veterinary surgeon saw them, they were still lame, refusing to leave their beds, taking no exercise, and squealing with pain when forced to move. One of the pigs was killed in order to make a thorough examination of the bones, and it was found that the necks of both shoulder

blades had been recently fractured, but had commenced to reunite. The bones of other parts of the body were also found to be exceedingly weak for pigs of the age, and the surgeon ordered phosphate of lime and sulphate of iron, together with milk, vegetables, and a greater variety of food than the pigs had been getting. After some time the animals improved so rapidly under rational treatment that they were sold at a profit.

### THE TENDENCY TO WEAK BONES,

or bones which have been supplied with more than enough organic or vegetable matter and not enough inorganic matter, a weakness sometimes called "rickets," is to a certain extent hereditary, but is in nearly all cases induced in the animals themselves or in their progenitors by injudicious feeding—by the use of ill-balanced rations. Experiments made at the Wisconsin Experiment Station demonstrated that the bones of swine fed on different foods vary in strength, and that where Indian corn is fed in excess and without a due amount of nitrogenous food, the bones are notably weak. It was found that the bones are sometimes so weak that they actually break. Another direct cause of weak bone is want of exercise; and strong bones can only be produced by good breeding, judicious feeding, and abundance of exercise.

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### Sows and Litters.

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The question has often been asked, How many pigs should a sow farrow in a litter? That all depends upon circumstances, but it may be taken as an invariable rule that a young sow should not have so many youngsters as an old one. Then, too, a sow in poor condition during pregnancy should have a smaller litter than one in good breeding flesh. Each mother should be in such bodily condition as may best enable her to stand the drain of suckling her offspring. Immaturity or unsuitable condition calls for relatively small litters. If a sow has the capacity to produce ample milk to suckle eight pigs until ten weeks of age, and keep them growing strong and healthy, then it is a loss to a breeder if she kills a part of

her litter, or farrows any number less than eight. The most profitable use of any sow calls for the production of the greatest number of pigs possible, which may be reared without detriment either to them or the dam. A good brood sow will, of course, usually lose in flesh while suckling a full-sized litter, but this is not to her disadvantage, as it is a perfectly natural operation. As soon as the pigs are weaned she will rapidly take on flesh if fed sufficient food. Before weaning, her appetite is greatly increased, so that she consumes enough food to supply her pigs from this increased consumption.

### SIZE AND QUALITY OF LITTERS.

A sow in her first litter should farrow at least seven. She should produce these at about 12 or 13 months of age. In her prime I consider a litter of twelve as large a number as she should ordinarily suckle to weaning time, though some sows are capable of handling more. From these larger litters any inferior, undersized runts should be destroyed, and only vigorous, growthy pigs kept for suckling. In fact, runts from any litter should be destroyed. Sows that farrow only four or five to the litter are not doing satisfactory breeding service. This condition usually occurs with short-bodied, chunky sows. The better type of brood sow should be fairly long-bodied, on short legs, and with deep sides. Her back should also be strong and straight, sagging being very undesirable. Her mammary development should be superior. While suckling the glands of the udder ought to be shapely, with teats of good size, so that the pigs may be able to suckle easily. A breeder does not usually need to keep brood sows with little short teats, or with milk glands of a defective character, where pigs have to work hard to obtain nourishment. Farmers do not often take note of this important feature of the brood sow.

### BREEDERS OR FEEDERS?

Now the question arises, should a farmer producing pigs for breeding purposes prefer the smaller litter than the one breeding for feeders? There does not appear to be any reason why there should be any difference here. In either case the pigs should be kept growing as fast as



possible while suckling. The real difference in handling comes in after four months of age. Then the pig designed for the pork barrel may begin to have a greater fattening food that the one to be used for breeding; and at six months of age the diet of the two groups of pigs should be materially different. The lard pig of to-day, the chubby, dumpling sort, is deteriorating. Litters are becoming far too small, and profits are thereby lessened. Breeders should look for a growthier, more productive pig. This oftentimes means the difference between profit and loss. There are certain individual sows that farrow much larger litters than others, and by selecting from these one may develop a strain that will do far better in farrowing than those selected indifferently. In purchasing pure-bred pigs, buyers will be wise to ascertain the size of litters from which stock is offered them. Records of this kind should be kept by all breeders, not only for their own information, but also in order to impart them to others when selling.

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## Handling Pigs.

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Notwithstanding the amount of matter written concerning the pig, there is very little indeed that touches the actual handling, and yet it is necessary to handle properly if the management is to be first-class in every respect. Pigs need to be handled quite differently to other stock. Horses, for instance, are led, ridden, or driven; certain classes of cattle are led, the bulk driven; sheep are both driven and carted, but are, except just after being clipped, easily lifted about by means of their coats. Sheep also, it may be added, are easy to drive along a road because of their habit of keeping together. Pigs, however, cannot be led; they are very bad to drive, either singly or several together, herds having a tendency to stampede several ways at once if alarmed or hustled; and so, except for very short journeys, it is customary to cart swine about when moving them. Pigs change owners more frequently than do other farm stock, and the result is that swine are constantly being handled.

## WHEN A PIG IS BORN

it is at times necessary to handle, the object being to guide the little creature to the teat. First of all allow it to gain a little strength of leg, and then if it gradually totters its way to the teat let it alone, but if after giving it a fair chance it seems to get no forwarder, by touching it gently with the fingers, now upon this side, now upon that, direct it to the desired place. A healthy, newly-born, young pig should be guided in this manner in preference to lifting up bodily, because to do this means that the youngster will squeal, which will irritate and disturb the parent, who by moving about may injure some of the litter.

## CASTRATING.

In most litters there is castrating to be done, and this, when considered necessary, should be done before the young leave the dam, and means the handling of the selected animals. Remove the mother far away, seize the selected animals, one after the other as required, by ear and hind-leg, and by a dexterous movement swing up, head downwards; place the pig's head and shoulders between the legs, transferring the hand from the ear to the other hind leg. Hold the hind legs and shoulders firm, the back of the pig being towards the holder.

## CARTING.

From now on until weaned more handling is rarely necessary, but when weaned the animals are generally either carted away to be sold at the auction-mart or rung to keep upon the holding as stores. When intending to load up young pigs first get the vehicle ready, and then bring it as near to the sty as possible. Have the bottom of the vehicle well bedded with clean dry straw, and tie the pig-net over the top so that there is no chance of the pigs scrambling out. Leave one corner loose or arrange that the door at the end of the vehicle can be opened to admit the pigs, and then set about the catching. No better plan can be followed in the catching and loading-up of young pigs than that of catching hold by the hind-leg and ear, then, still sticking to the hind-leg, slip the hand from the ear to under the fore part of the pig just behind the fore legs, and thus lift the animal up and place it into the

vehicle. In unloading the same method of handling may also be followed, though at many places handling is unnecessary when unloading, some contrivance being on hand to enable the pigs to be driven safely out of the vehicle to the ground. To load heavy pigs into a vehicle the best plan to follow is to have a low vehicle, back it up against a manure heap or convenient bank, and drive and push the animal in. If to be lifted a medium-sized pig requires two men, one upon each side, taking hold each of one ear, and clasping hands under the body of the animal with the hand not holding the ear. A very heavy pig requires another man or two, but, generally speaking, such pigs can be loaded by means of a little foresight without having to be lifted bodily. To handle pigs to the best advantage a little patience is generally advisable.

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### Successful Farrowing.

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The sow should be allowed to sleep in the sty that is intended for her to farrow in for at least two or three weeks before due, to admit of her getting accustomed to her surroundings and settling down to quiet and comfort. After she has fairly settled down in her farrowing quarters, and has selected the portion of the sty that she prefers for her regular sleeping apartment, do all possible to keep manure and drainage away from the spot she has selected, without materially upsetting the general situation.

### THE LITTER.

Give her a good supply of the best wheat straw several days before she is expected to farrow, but under no consideration give her long straw just at the time of farrowing, nor for a week or ten days after, as however careful a mother she may be, she is very apt to smother some of her family when they are coiled up in long straw, as they have not the opportunity of freeing themselves that they have when lying in short straw. This shows the advantage gained by bedding the sow down several days previous to farrowing, which is that the straw has become short by being lain on by the sow, and by being prepared by her just previous to



farrowing. Some people have a supply of short or chopped straw in readiness to put in the sty as soon as they find that the sow has commenced to prepare her bed, and remove the old bed; but when this would meet with the sow's entire approval in one case, it would be adverse to her natural instinct in a great many cases, and anything adverse to her natural instinct tends to distress her and make her careless, and in this state she often lies on some of her offspring, whereas, if all is done that can be to encourage her in her own natural way she will give the necessary care and attention to her litter.

### TO PREVENT OVER-LYING.

In cases where it is known that a sow has been careless and smothered some of her litter at a previous farrowing, the following precaution has been successful: Fix a good stout rail about from ten to twelve inches from the floor, and about eight inches away from the wall, around the sty, or about that part of the sty which the sow has selected for her bed. This makes a place of refuge for the young pigs in the event of the sow lying down suddenly and carelessly, as it prevents her lying close up to the wall, and leaves a space between the sow and the wall for the pigs to get into safely. When, however, this course is resorted to, the rails should always be fixed a week or two (or even more) before farrowing, so that the sow may accustom herself to their presence. The carelessness referred to in this case on the part of the sow is often the outcome of inexperienced treatment of her at her previous farrowing. Under no consideration allow curious persons to worry the sow at farrowing time, because however sociable the animal may be in the ordinary way, the presence of anyone at these times irritates her. She has quite enough to do to bear her own bodily feelings and look after her family.

### THE SOW

should not be highly fed for a week or ten days. All that has to be considered for this term is normal warmth, comfort, quiet, and non-stimulating food, with an opening tendency. Thin slop of bran or pollard mixed to the warmth of new milk as it comes from the cow is generally the best food that can be given. After about a week or ten days the system will be, in ordinary cases, quite

cleared, and with the sow taking a substantial interest in home and duty, it is then time that she should be having better food, so that she may rear a good strong litter.

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### Signs of a Good Milker.

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The first attribute of a large milker is the size of the udder; mere size alone, however, is no indication, it must be accompanied by other well defined marks. The udder, besides being capacious should be well shaped, square below, deep, and covered with plenty of fine hairs. The teats, too, should be large, and well set on at the four corners. This enables them to be well handled, and so helps the milker to extract the milk. A small teat is an abomination.

Another feature to be looked for is the presence of rudimentary extra teats. These extra teats are generally considered a highly valuable sign of milking qualities. So deeply ingrained is this idea in the minds of some breeders that they insist upon finding sires for their herd which also possess these rudimentary teats.

The escutcheon is another sign always held in great esteem by breeders of dairy cattle; it is to be found upon the hind-quarters of the cow, between the thighs. If the hind quarters be carefully examined, it will very soon be noticed that the hair points in a downward direction from the root of the tail towards the udder. This is no exception to its position in other parts of the body. But if attention be next directed to the inside of the thighs, and the skin covering the posterior face of the udder, it will be seen that there is a large or small quantity of hair which turns upwards in the reverse direction to that which is usual. The surface over which the hair points upwards, and so forms a well defined mark on the hind quarters, is known as the escutcheon. This theory was first advanced by a man named Guenon, who was a French cattle dealer. He was accustomed to handle a very large number of milking cows during the course of each year, and being a clever man, he very soon found that those cows that did well at the pail were those that were distinguished by the possession of a well-marked escutcheon. So con-

vinced was he of the connection between the dairy qualities of a cow and the escutcheon that he brought the theory before the public. The French Government were subsequently moved to make an inquiry into the correctness of his views, and, although they did not find that they could go quite as far as Guenon, they nevertheless decided that the escutcheon was certainly a most valuable indication of milking capacity in a cow.

It is often quite a simple matter to distinguish the extent and outline of the escutcheon by a cursory glance. The hair which turns upwards reflects the light differently to that running downwards. However, it sometimes happens that the task is not so easy, and in such cases it is a very good plan to pass the back of the hand down the hindquarters beneath the tail. This will speedily reveal the direction in which the hair is growing. But it is especially necessary to notice the extent of the escutcheon, for its value varies in direct proportion to its size. The larger the escutcheon the greater, as a general rule, the value of the cow. In nearly all cows a large portion of the escutcheon is hidden in the folds of the skin, both on the inside of the thighs and upon the udder. The result is that the real dimensions are often dependent upon the looseness of the skin covering these parts. If it is tight, most of the escutcheon is presented to the view; if the skin be loose, its extent can only be estimated by drawing out the skin. Thus a very different picture would be presented of the same escutcheon where the creases of the udder and the thighs had been extended and where they had not. So it is evident that a very careful scrutiny is often necessary before a correct conclusion as to the real extent of the escutcheon can be arrived at. The explanation of these signs is as follows: As already stated, the escutcheon is formed by the hair of the udder or thighs turning in a particular direction. But the direction of the hair is not a mere freak of nature; it is influenced by the direction and size of the arteries, which keep the mammary glands supplied with blood. Nothing is more certain than that, in order to have perfect milk secretion, the udder must be liberally supplied with blood. Now, where there is a large surface of hair pointing upwards upon the hindquarters from the udder to the root of the tail this is a sure sign that the arteries supplying the udder are large, that they convey a plentiful quantity of blood, and that



consequently they encourage the activity of the glands. To such an extent is this the case, that it has been pointed out that when the escutcheon extends further on one side of the udder than the other, one half of the udder will give more milk than the other.

Every good milker should possess a well-marked milk vein. The milk vein runs along the floor of the abdomen towards the udder. By passing the hand along it it can easily be felt. The milk vein must be taken to be one of the best evidences of milking quality.

The points to be looked for then, consist of (1) a large, well-made udder with good-sized well-placed teats; (2) a well-marked escutcheon; (3) a prominent milk vein, and (4) one or two extra or rudimentary teats. When two or three of these are combined in the same animal the evidence should be overwhelming.

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## Salt for Dairy Cows.

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### INTERESTING EXPERIMENTS.

The great value of salt for most classes of farm animals is now fairly well realised by dairymen and stockowners, but for all that many will be interested in learning the details of some experiments which have been carried out at the Wisconsin Experiment Station by Prof. Babcock, the object of which was to ascertain the influence salt has on the health and milk producing powers of dairy cows. In these it was found that in every case where cows had been deprived of salt they exhibited an abnormal appetite for it, but in no case did the health of the animals—as shown by general appearance, the live weight, or the yield of milk—appear to be affected until after they had been deprived of salt for longer than two or three weeks. The period of immunity varied with individual cows, from less than one month to more than a year. In every case where salt was withheld a condition of low vitality was finally reached, in which a sudden and complete breakdown occurred, from which recovery was rapid if salt were supplied. This stage was marked by loss of appetite, a general haggard appearance, dull and lustreless eyes, a rough coat, and a very rapid decline in both live weight

and yield of milk. The breakdown was most likely to occur at calving time or immediately after, when the system was weakened or the flow of milk large.

### IN GENERAL

the cows giving the largest amount of milk were the first to show signs of distress, and all suffered less on pasture than when confined to the byre. The behaviour of the cows during the experiment indicated that their food contained sufficient chlorine to maintain them in health while dry for an indefinite period, and it seems probable that, under general conditions, a dry cow or a steer would suffer no inconvenience if given no salt, except that contained in a normal ration. The ration given in the experiment, according to Prof. Babcock's calculations, contained chlorine equivalent to three-quarters of an ounce of salt per day, and it is assumed in the report that this is the minimum amount of salt required for 1,000 lbs. of live weight to maintain an animal that is not producing milk. If this amount is not present in the food it should be supplied directly. In addition to this a cow should have enough salt to compensate for the chlorine in the milk produced, the amount to be so given being estimated from these experiments to be one ounce per day for ordinary milkers, exceptionally heavy milkers requiring more. Owing to the uniformity of the results with all the animals, it is claimed that these experiments prove conclusively that salt, in addition to that given in the food, is absolutely essential to the continual health of a dairy cow while producing milk.

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### Scour in Calves.

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Every farmer knows what a scourge scour is, and how much more profitable his business would be if it never attacked his herd. But, at the same time, farmers do not take sufficient precautions to ward off its attacks. Such precautions would go much further in check-mating scour than all the remedies ever invented. I have little doubt that in the majority of cases it is directly attributable to dirty litter and the treatment of the calf at birth. If the cow is properly attended to at calving time no evil results should ensue.

## CAUSES.

There are two causes of scour in calves (1) want of cleanliness in their surroundings at birth, and (2) improper feeding. (1) The floors of all cow-houses should be kept as clean as possible, and disinfected once a week with a carbolic solution or one of blue stone (2 lbs. of blue-stone to three gallons of water). When the cow is expect to calve she should be given a shed to herself and plenty of fresh, clean litter. It will be none the worse if a solution of carbolic acid is sprinkled about the floor. Of course, at any time of year when the weather is warm enough there is no better plan than to let the cow calve out in the field. There is so little risk, as a general rule, of anything going wrong; the cow is able to choose a quiet spot which suits her and the calf is dropped upon the clean grass instead of upon some more or less foul litter. Under these circumstances the cow should be watched, so that if the calf is weak or gets a chill it may be fed or brought under cover. But in the case of valuable cattle it may be thought safer to allow the cow to calve in the shed. As soon as the calf is dropped put it in a corner on a clean bed of straw which has been disinfected. When it has got upon its feet and begun to suck for itself it may be turned out, and most of the danger will be past. The disease, when contracted immediately after the birth, is probably due to the entrance of germ through the navel cord. It is a well-known fact that the typhoid bacillus is almost universally prevalent in cow-houses, and very probably the germ finds admission to the body of the young calf through the navel cord. On this account, treatment of the cord has been recommended. It is suggested that it should be tied immediately after birth with twine which has been kept in a solution of lysol. As soon as the cord has been tied the portion adhering to the calf and the surrounding area must be well painted with a solution of iodine in methylated spirits (35 grains of iodine to two pints of methylated spirits). Soon after the navel cord should be again dressed with Stockholm tar. The person attending to these operations should thoroughly disinfect his hands and clothes with a solution of carbolic or lysol. There cannot be the slightest objection to treating the calf in the foregoing manner, and it may result in preventing disease; but when every pre-



caution has been taken to ensure absolute cleanliness in the cow-house and in the bedding, or when the cow has calved out-of-doors, I think it is hardly necessary. Unless the navel cord comes into contact with some form of dirt soon after birth there is little danger of disease.

### IMPROPER FEEDING.

(2) Another common cause of diarrhœa—which is akin to scour—in young cattle, is improper feeding. It should never be forgotten that the calf, in its natural state, runs with its dam and sucks for itself. It only drinks very small quantities at a time, and this at the natural temperature of the body. As a consequence, when calves run in the field with their dams scour is seldom seen. But what happens under the artificial conditions of breeding which generally obtain? As soon as the calf is dropped it is taken away from its dam and fed by hand. At first it may be given a portion of its mother's milk, but owing to the exigencies of farm work it only receives this at long intervals of time. When this variation from the natural method is coupled with the use of skim-milk instead of fresh, and this fed cold instead of warm, and often sour, the gravest consequences ensue. The digestive apparatus of the calf is a delicate one, and is only intended to work thoroughly upon warm food. Every dairyman knows that milk which is rennetted at a high temperature sets more quickly than when the temperature is lower. Exactly the same system it at work in the stomach of the calf (rennet is the extract of this stomach), and therefore when the milk is fed cold the gastric juices cannot properly fulfil their purpose. The result is that large quantities of undigested milk are left in the stomach of the calf from one meal to another, and unless something is done at once to expel these the evil becomes worse from hour to hour, until finally the calf dies.

### TREATMENT.

As soon as we have grasped the cause of diarrhœa or scour we can understand the treatment of it. Always give the calf its mother's milk for the first four days at least. Separated milk should not be used until the calf is four weeks old. The change from new to separated milk should be gradual. The calf should have a substi-

tute for the cream removed by the separator. One to two ounces per day of the best cod liver oil, or a mucilage prepared by steeping flax seed or good linseed cake in hot water, will be found useful for the purpose, if the quantity is carefully regulated in accordance with the state of the bowels. Feed as often as possible, and only small quantities at a time, and always warm the milk to about 85 to 90 degs. before using it. Above all, see to the absolute cleanliness of every utensil employed in feeding, and to the calf-houses themselves, and whenever cases of diarrhoea occur isolate the infected animals and use copious libations of carbolic upon the floors and walls. Also give the sick animals a dessertspoonful of castor oil, and repeat every 12 hours until the obstruction is removed.

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### **Working a Separator.**

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In up-to-date butter-making the use of a cream separator is quite indispensable. The old-fashioned plan of setting the milk in pans for the cream to rise, and then skimming it off, is both troublesome and wasteful. It is impossible to obtain anything like a thorough extraction of the butter-fat from the milk by the method of raising cream in pans, and this method, therefore, involves a loss of butter. A good and efficiently-working separator ensures practically a complete separation of the butter-fat from the milk, as at the outside not more than about  $\frac{2}{100}$  (1-5th) per cent. of fat is left in the separate milk, provided the process of separating the cream is carried out in a proper and careful manner.

### **RATE OF WORKING.**

In working a separator it is most important that the rate of speed at which it is turned should be properly regulated, the thoroughness of the separation of the butter-fat depending upon this to a considerable extent. The proper rate of speed at which separators should be worked varies somewhat in different makes, and the number of revolutions to be made per minute is usually indicated on the instructions as to the working of the separator that are sent with the latter when it is purchased. If

the separator is worked at a very rapid rate of speed, cream of very thick consistency is obtained; but a loss of butter-fat is also incurred under these circumstances, as the separation of the fat is not so thorough as it is when the separator is worked at a more moderate speed. When the separator is turned slowly, a thin cream is obtained. For churning purposes cream should, of course, not be too thick in consistency, cream of medium consistency being the most suitable for churning.

### TEMPERATURE OF THE MILK.

A point of importance that requires attention in separating milk is the temperature of the latter when put through the separator. The correct temperature is from 85 deg. to 94 deg. F. When the temperature is lower than this the extraction of the butter-fat from the milk is less complete, and consequently there is a loss of butter. The milk, as it comes from the cow, has a temperature of about 96 deg. F., and in order to ensure as complete a separation of the butter-fat as possible it is advisable to pass the milk through the separator as quickly as can be managed after it has been obtained from the cows, and before it has time to cool.

### CLEANING THE SEPARATOR.

The separator must be well cleaned immediately after use. Failure to keep it thoroughly clean adversely affects the flavour of the cream, and consequently that of the butter made from it is also impaired. It is of particular importance to remove the slimy, so-called "separator-residue" from the drum when the process of separation has been completed. When not in use, it is advisable to cover over the separator with a cloth, in order to prevent it from getting dusty.

### THE PROPER PLACE

in which to set up the separator is, of course, the dairy. As milk is most liable to become tainted or to absorb strong smells, it should never be manipulated in a place which communicates with the cow-byre or shed, but ought always to be removed out of the cow-house immediately after it has been drawn from the cows.



## Poultry Notes.

### PERCHES.

It is a frequent occurrence to see the perches in the roosting-house fixed at too great a height from the floor, and to this mistake several diseases and ailments may be traced. Bumble foot, leg weakness, and corns are often caused by alighting from high perches; and in descending heavy birds drop with considerable force, and are liable to strain themselves or force pieces of gravel or sharp grit into the feet, thus causing either lameness or soreness. The height at which perches should be fixed from the floor depends upon the breed of poultry to be provided for, twelve inches being sufficient height for large and heavy breeds; eighteen inches to two feet for those of medium size; and two feet six inches for small and lightly-built birds. The size of the house should also be taken into consideration in fixing the perches. In a small house they must not be fixed very high, as the birds would be likely to injure themselves when descending owing to want of flying space. Several large breeds of fowls—for instance, Cochins and Brahmas—do not care for roosting on perches, and, as a rule, do better when bedded on soft straw. This should be shaken up every morning, and the floor underneath covered with lime and earth to a depth of two inches, all being periodically changed at least once every week or ten days. Sufficient roosting accommodation, should be provided to prevent overcrowding, and the perches fixed in the warmest portion of the house, as far away from the door as possible and near the window, as fowls greatly appreciate light. All perches should be fixed on the same level, not fixed one above the other, and so placed that the cocks do not damage their tails against the sides of the building. Perches in every case should be so constructed that they can be speedily and easily removed, but at the same time be firmly fixed in such a manner that there is no possibility of their falling when the birds fly up. Also they must be of sufficient thickness to prevent their being planky—that is, bending when the birds move on them. It is often thought that perches with the bark on are the best for poultry, as the rough surface affords a better hold for their feet; but, when the bark loses its greenness and

becomes loose and dry, a harbour is provided for thousands of vermin between the loose bark and the perch, these, of course, becoming a nuisance and source of trouble generally, as well as greatly irritating the poultry during the night. Perches that are perfectly smooth are the most suitable, and should they contain any shakes or cracks these must be filled up with putty or thick lime to prevent harbourage of any kind of insects. With regard to the proper width or diameter of perches, this varies from  $2\frac{1}{2}$  inches to  $4\frac{1}{2}$  inches, according to the size of the birds, the former being suitable for light and slender birds, increasing to the latter for heavy varieties.

Cleanliness is, without doubt, one of the most important and essential factors in keeping poultry free from disease and vermin; and, as the perches are constantly used by the fowls, they should receive special attention in this direction, as well as the sockets which hold them, as insect pests are most likely to be found in situations such as these. The house should be frequently lime-washed inside, including the perches, whilst the latter should also be soaked entirely in paraffin. A coating of a mixture of tar and paraffin, where the perches fit into the sockets, is a sure preventive against vermin lodging at these points.

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## Crossing Poultry.

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Very many utility breeders will be on the look-out for a class of fowl that will serve the double purpose of being both layer and table bird. In pure breeds we cannot get a combination of these two qualities in the one fowl. Some strains of Houdans certainly are remarkably good all-round birds, but they are not suited to a more or less knock-about life. The Faverolles was brought out as a fowl combining the two great utility qualities, and for some years it did all that was expected of it. Now, however, the Faverolles is yearly becoming more of a table bird and less of a layer. To produce a fowl, therefore, that will suit his requirements, the utilitarian has to resort to crossing two pure breeds together. He is able, with due discretion to produce a cross-bred fowl that will serve his purpose infinitely better than any pure breed could possibly do.

## DEFINITE OBJECT NECESSARY.

Crossing must never be indiscriminate. There must be a distinct object to be attained. Happy-go-lucky methods lead nowhere, except to a disappointment. Some knowledge of the more important effects of crossing should also be gathered. It is as well to know, for instance, that the act of crossing two distinct breeds often leads to a reversion of character. The progeny from two non-sitting breeds will nearly all be sitters. The instinct, long lost in the parents, reappears in the cross-bred with all the old vigour. Crossing imparts hardiness and vital energy. If the male and females have been chosen from prolific laying strains the tendency to lay well will be transmitted and intensified in the pullets. Then, if the breeds are properly selected we may produce cross-breds that contain some of the good qualities of both the parents. The useful properties of a breed that is too delicate to be of any practical use in its pure state may be transmitted to another by crossing, and none of their value will be lost. It must always be remembered that the older the breed the more potent its influence. To cross newly-made breeds that are themselves the result of recent crossing is seldom of any practical use.

## THE AIM OF CROSSING.

As I have already stated, the end and aim of crossing is to produce an all-round fowl. We have valuable laying strains of Anconas, Leghorns, and Minorcas, but these breeds are purely layers, and the cockerels often fetch next to nothing as table fowls. But procure a well-developed Houdan sire and mate him with selected hens from any of the above, and the result will be a really good all-round first-class cross. The progeny will be very hardy, first-rate layers, and table qualities will be vastly improved. The size of the Houdan, its length of breast, quality of flesh, and natural activity, will blend with the prolificacy of the females. If the strain is good on both sides I know of no better cross-bred fowl for general use than the Houdan-Minorca. The Houdan-Langshan may also be mentioned as a grand cross. Here table qualities will be higher than when the Minorca is used, but the egg-production may be somewhat lower.



## THE HOUDAN COCK.

Improvements will always follow the introduction of a Houdan male, and it is an extraordinary thing that the breed has not been used to a greater extent by farmers and utility poultry-keepers. Even the farmyard mongrels will produce youngsters that are fifty per cent. better as useful fowls when sired by a Houdan cock.

## INDISCRIMINATE CROSSING.

To pursue a course of indiscriminate crossing, I repeat, is the merest folly, and to judge by the advertisements one reads some people appear to have gone crossing mad. To mix up varieties together, to cross Orpington with Wyandotte, or Ancona with Leghorn, is a waste of material, time, and money. Go in for a well-tried cross, using old-established breeds whose characters stand out boldly, and whose blood is so potent that one knows what the result will be. Beyond that we need not go. The poultry-keeper who is for ever trying a new experiment in crossing, and who is eternally dissatisfied, will, I am afraid, be one of those unfortunate individuals who will remain dissatisfied all their lives.

## CROSSING FOR THE TABLE.

The same general rules apply when breeding for table purposes only. The Indian Game-Dorking combines the gaminess, depth of breast, and fine "short" flesh of the one with the length of body, juicyness, and whiteness of the other. The crossing, too, imparts vigour to the chickens. They are hardier than the pure Dorking, and can do well anywhere. A large, well-selected Houdan may also be used for breeding table fowls exclusively. The hens may be crossed in the same way as Dorkings are, or the male may sire Indian Game, Rock, Brahma, or large white-legged Old English Game hens. A beginner with even a slight experience will know what to expect if he blends these old breeds, keeping in view their strongly-marked individual characters, but with new breeds he is never on safe ground when crossing for utility.

**NEVER RE-CROSS THE CROSS-BREDS,**

or the stock will verge into mongrelism. Perhaps, in isolated cases, an experienced breeder may deem it advantageous to re-cross for some definite object, but otherwise it is a thing to be avoided. A small pen of birds, say a cock and eight hens, will produce two or three hundred chickens at the very least during the season, and that will be enough for most people who are not poultry farmers on extensive lines.

**WATERFOWL.**

In the case of waterfowl we have not a very wide scope for crossing. Pekin ducks crossed by an Aylesbury drake produce the well-known Aylesbury-Pekin duckling, famous for its rapid growth and hardihood. The Pekin, too, is a better layer than the Aylesbury, so that in producing the above cross eggs are easier to get in the very early months of the year. In districts when a smaller duckling suits the market large Runner ducks mated to a thick-set Pekin drake will produce profitable table birds, and the Runners can always be relied upon for eggs.

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**Some Laying Breeds.**


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**I.—NON-SITTERS.**

There are many people who still appear to consider that "strain" and "breed" are synonymous terms, and for their benefit it may be as well to point out that they are totally wrong. A strain is a family or offshoot of a breed, which, while retaining all the characters of the latter, has developed some additional features of its own. A strain cannot be made in one or two years, but the process is a long and tedious one, demanding both skill and patience. There may be, and are, many strains of each breed and variety. To the egg-producing poultry farmer strain is of much more importance than breed. It is just as essential to him as a pedigree is to a dog-breeder. In fact, every breeder of live stock, from fancy mice to race-horses, recognises the distinct and potent features of the various strains of a breed. Horticulturists—flower and vegetable growers—also know how wide the difference

may be between the variety of sweet pea or potato raised by Smith and the same variety raised by Brown. It is all a question of selection and breeding for some clearly-defined purpose. In speaking, therefore, of laying breeds it must be understood that, while certain breeds are, on the whole, better than others, strain must always be looked to as the most important feature.

### NON-SITTERS.

Layers may be roughly divided into two classes, sitters and non-sitters, the former producing tinted eggs and the latter white ones. The non-sitters are, as a rule, the most prolific, and there is a long list of them to choose from. Anconas, Leghorns, Minorcas, and Houdans are, perhaps, the most popular and profitable. These are all active fowls, preferring an open run and making the most of it. The Minorca, however, is exceptionally well suited to confinement, and the Ancona is the best forager of them all.

### THE ANCONA.

It is probable, too, that an average Ancona is a better layer than an ordinary individual chosen from any of the other breeds, for the reason that the race to which it belongs has not been so much subjected to exhibition breeding as the other breeds. Anconas that have been reared on free runs should not be kept in confinement, but, if they are brought up in a limited area, they will do well and prove to be remarkably prolific in enclosed runs. This breed is a first-class one for the egg producer who can house his layers in the open field. It is exceptionally hardy, the eggs are of good size, often above the average, and few fowls know how to find their own living as well as Anconas. They will lay equally as well in winter as the heavier kinds, and, as the breed is steadily increasing in popularity, there is usually a good demand for the eggs for sitting purposes.

### THE AVERAGE LEGHORN

runs the Ancona very close as a layer and forager. The breed is a hardy one, and the white, brown, and black varieties are the most profitable. The last-named has



had a great run of popularity lately, which does not, as yet, show any indications of waning. It is a distinctly handsome fowl and undoubtedly a good layer. The utility poultry-keeper would do well to avoid those strains of Leghorns which have abnormal combs and which suggest, only too clearly, the work of the fancier. There are plenty of hardy strains of good layers among the Leghorns that have moderate-sized combs and unimpaired economic qualities. The Brown Leghorn is a gorgeous variety, and has in reality but little brown about it. The cock is adorned with a striking plumage of various shades of gold, maroon, red, and lustrous black, while the hen has a beautiful golden yellow, salmon-red, and the delicate pencilling of the partridge colour. The variety is as useful as a layer as it is ornamental. The White Leghorn is the most generally kept, but not through any peculiar merits of its own. In America it has always been a great favourite as a layer, and there are many strains in this country also that are wonderfully prolific. There is a general belief that white animals and birds are less hardy than coloured ones, and, on the whole, I think it is a legitimate one. It is true that the inhabitants of the polar regions are white, and one might suppose that that fact would be an argument against the generally-accepted theory on the delicacy of the white creatures. But, it must be remembered that while natural selection has been the agent which brought about the prevailing whiteness in the polar animals, that same law would, under such extremely severe conditions of life, also promote extreme hardness.

## THE MINORCA

is a breed of old standing, and possesses really good utility properties. Apart from its adaptability for confined runs, its plumage does not show the dirt, so that birds of this breed, if well looked after, present a respectable appearance in the smokiest of town gardens. It lays the largest eggs of all the Mediterraneans—probably of all fowls—and many strains are extraordinary layers. As in the case of Leghorns, Minorcas have in some hands been spoiled for utility work, and the egg producer must avoid those birds that have the “beef-steak” type of comb. Minorca cockerels are better for table purposes than those of any

of the other Mediterraneans, which is a point to be considered by farmers and poultry-keepers who do not specialise.

### THE ANDALUSIAN

is an attractive-looking fowl and still a good layer. It is hard to account for its want of popularity among egg-producers. Many, no doubt, are not acquainted with its virtues, and those who have good strains either selfishly keep them to themselves or it never enters their heads that a gentle "push," by way of advertising, is desirable. The Campine had a short but a merry life, and some strains were, and are still, really good layers. The eggs were, however, somewhat small, which is a bad feature in any breed. The same may be said of the Hamburg, a breed that is extremely local in its distribution now. That there is good material in the Hamburg must be admitted, and the breed only wants developing on utility lines. It, as a whole, has been allowed to lapse, perhaps on account of the smallness of the eggs and the birds themselves, but it must be remembered that Hamburgs, like Anconas, are very small eaters and great foragers—two important features.

### THE HOUDAN

is one of the most useful fowls we possess. In the pure state it is a good layer and a fine table bird, but it is better still in a cross. In fact, one might almost suppose the Houdan to have been designed by nature for the express purpose of providing poultry farmers with an all-round fowl! Mediterraneans, Asiatics, and Americans, if crossed by a Houdan sire, will produce useful progeny of extreme hardiness and great prolificacy. The egg-specialist who desires to improve his stock in vigour can hardly use a Houdan cock in the wrong place. Granted that the strains are good on both sides, the following may be mentioned as good laying crosses: Houdan-Ancona, Houdan-Leghorn, Houdan-Minorca, Houdan-Orpington, Houdan-Langshan, Houdan-Wyandotte. The last three are also useful for table poultry, and may be kept on almost any situation, as they are extremely robust and vigorous. As a general rule, it pays best to go in for pure breeds, keeping the great principle of selection always in view. Indiscriminate crossing is a most decided mistake.

## Report of Specimens of Nodules from Plumtree, District Matabeleland.

The analysis of this sample shows that these nodules contain the following amounts of lime and phosphoric acid:—

Carbonate of Lime ... .. 75·5 per cent.

Phosphoric Acid ... .. 3·3 per cent.

The phosphoric acid is present in the form of a bi-calcic or reverted phosphate.

These nodules are a little more than half an inch in diameter, but they look considerably weathered. It is probable that deposits may exist in that locality containing a much higher percentage of phosphate. However, this material is of very considerable value as a dressing for land, especially for black soils standing in need of lime as well as phosphates. These nodules should be ground pretty fine, and applied at the rate of not less than 600 lbs. per acre. The value of this sample is about £6 per ton.

### SOIL ANALYSIS.

The following are the analyses of six samples of soil sent to the Department from a farm in the Gwelo district:—

No 1.

#### Chemical Analysis.

|                                       | A.    | B.   | C.    | D.    | E.   | F.    |
|---------------------------------------|-------|------|-------|-------|------|-------|
| Insoluble Residue ...                 | 71·5  | 80·7 | 72·4  | 63·0  | 73·0 | 80·7  |
| Iron and Alumina ...                  | 12·5  | 18·0 | 9·74  | 20·13 | 13·0 | 11·0  |
| Lime ... ..                           | trace | ·08  | trace | ·10   | ·09  | trace |
| Phosphoric Acid ...                   | ·08   | ·03  | ·07   | ·10   | ·09  | ·08   |
| Potash ... ..                         | ·10   | ·08  | ·09   | ·07   | ·08  | ·10   |
| Loss on Ignition (Organic Matter) ... | 16·0  | 8·0  | 16·0  | 12·0  | 16·8 | 17·3  |
| Soluble Humus ...                     | 6·4   | 2·3  | 5·6   | 4·6   | 7·3  | 8·5   |



## Mechanical Analysis.

|                          | A.<br>nil | B.<br>nil | C.<br>nil | D.<br>nil | E.<br>nil | F.<br>nil |
|--------------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| Coarse Sand or Gravel    |           |           |           |           |           |           |
| Sand: Not passing 60 in. |           |           |           |           |           |           |
| mesh... ..               | 46.0      | 50.0      | 43.7      | 41.0      | 40.0      | 42.0      |
| Passing 60 in. but       |           |           |           |           |           |           |
| not 90 in. mesh          | 21.7      | 18.0      | 22.5      | 21.2      | 16.0      | 16.0      |
| Passing 90 in.           |           |           |           |           |           |           |
| mesh... ..               | 32.0      | 29.0      | 33.2      | 36.0      | 42.6      | 41.4      |
| Further separation of    |           |           |           |           |           |           |
| fine earth, passing      |           |           |           |           |           |           |
| 90 in. mesh.             |           |           |           |           |           |           |
| Fine Sand ... ..         | 51.5      | 60.0      | 56.0      | 49.0      | 15.0      | 53.0      |
| Silt ... ..              | 10.0      | 7.0       | 15.0      | 23.0      | 32.0      | 11.8      |
| Fine Silt ... ..         | 7.0       | 12.0      | 8.0       | 12.5      | 14.0      | 15.0      |
| Clay ... ..              | 16.0      | 8.0       | 17.0      | 10.8      | 16.8      | 12.0      |

The samples have been carefully taken, and were distinctly numbered throughout.

The crops which the owner wishes to grow on the different soils are as follows :—

|               |          |
|---------------|----------|
| A and B ..... | Tobacco. |
| C and D ..... | Lucerne. |
| E .....       | Wheat.   |
| F .....       | Orchard. |

A and B cannot be recommended for tobacco. A is much too heavy in the texture for growing the desired quality in the leaf. This soil, however, shows to be in a good condition of fertility for growing grain crops, but it is not so well suited for leguminous crops on account of a marked deficiency in the amount of lime present.

The unsuitability of B for tobacco lies in the soil being too shallow. Below the surface nine inches the subsoil immediately becomes hard rock, and there is thus an insufficiency in the mass of soil either for absorbing or giving up moisture. It is on this account alone that B is unsuitable, not only for tobacco but also for general purposes. Otherwise B is a fairly good specimen of a red soil, and, if found in sufficient depth, say two or three feet, it would be well worth cultivating for tobacco.

C is in nearly all respects similar to A, but it is a little more friable in the texture. It also, however, is poor in lime, and cannot be recommended for lucerne with any strong hopes of its being a success. The subsoil of C is sufficiently porous for absorbing, retaining, and giving up moisture; and, like A, is well suited for grain crops. On account of its remarkably good subsoil, it is worth trying lucerne on a small portion of C, just to see if it would get established on this kind of land after being three years down.

D is the only sample that can be recommended for tobacco. It is probably too heavy in the texture for bright cigarette tobacco, but it will yield good crops and of satisfactory quality in the heavier kinds of leaf. D has a fairly porous subsoil throughout, and does not appear to become water-logged. There is a considerable amount of free carbon in the subsoil, the origin of which does not appear very clear. If there is any banded ironstone in the vicinity of D, then very often parts of such rock are interspersed with graphite, which would account for it. This free carbon has no direct bearing on the fertility, but indirectly it is beneficial. Although D is the best soil for tobacco, it is not in any degree superior to the others for lucerne.

E is in all respects well adapted for wheat-growing, only, being so close in texture, considerable difficulty will be experienced in its cultivation. For this reason, when once ploughed and got into a workable state, care should be taken, as far as possible, to keep it loose—by ploughing and harrowing it again immediately on a crop being reaped, in order that the soil might not again become indurated and caked by lying in a hard state over the dry season.

F is better suited for orchard purposes; it is more friable in the texture than either A, C or E, and, also, it does not appear to become water-logged. It would be beneficial, however, to apply lime to the ground intended for fruit trees, as F is also deficient in lime.

There is no very well-marked difference in the composition of these various soils. They are all essentially derived from the same class of rock, and differing only in their situation and the amount of organic matter present.

They are all well supplied with organic matter, and are not at present in want of manure. Although there is so much soluble humus, yet these soils give no acid reaction. It appears, however, that this large amount of humus material owes its existence in great measure to deficiency in lime; but as long as the soils are bearing satisfactory crops there is no urgent need in supplying lime, only, whenever the fertility shows signs of failing, an application of lime will restore it.

It is interesting to note that, throughout all these soils, the openness of texture, particularly in the subsoils, is due to the presence of a large amount of mineral matter—crystallised silicate of alumina, combined with various metals. This mineral, which is apparently garnet, exists most largely in B, where it is over 20 per cent. of the total weight of the soil. All the other samples contain this material in greater or less amount. The action of this mineral is purely mechanical, taking the place of quartz sand in keeping the texture open, which otherwise, in most of these soils, would be rather close for practical working.

#### REPORT ON SOIL SENT TO THE DEPARTMENT FOR ANALYSIS.

This sample was taken on a farm at Insiza to a depth of two and a half feet, and lucerne is the crop desired to be grown. The land is at present under lucerne, having been down for two or three seasons. The lucerne grew very well the first and second year, but now it is making no headway, and fails to yield anything more than a fairly good pasture. The roots hold the ground very well, only the crop does not grow as should be expected.

On investigating the nature of this soil, it is found to be a calcareous loam containing 17 per cent. carbonate of lime. The subsoil contains only slightly less, and both soil and subsoil are well supplied with organic matter. There is no deficiency in any of the inorganic elements of fertility, but the re-action of the soil shows that it is alkaline, while the subsoil is very strongly alkaline. In the subsoil, sodium chloride is somewhat in excess of what is considered healthy, and sulphate of magnesia is largely in excess; this latter being at all times, even though in a small quantity, highly injurious to plant growth.



Through the retentive character of the subsoil an abnormal amount of soluble chlorides and sulphates are held therein. The injurious effects manifested on lucerne growing on such soil happen in various ways. When the roots reach down into the subsoil they come in contact with these alkalies, among which sulphate of magnesia, which is poisonous to lucerne and most other plants; but lucerne will grow very well without going far into the subsoil, provided the upper soil is rich in the elements of fertility and is well supplied with moisture. Now, in the present case the upper soil is without doubt sufficiently rich, and in certain circumstances there is also sufficient moisture; thus, when lucerne is sown on such well-prepared land, and a loose mulch kept on the surface for the first year or two, preventing undue evaporation, then the crop does very well. When, however, the crop covers the ground, and hoeing and harrowing for stirring the ground is suspended, then evaporation has more scope and the ground dries up to a greater depth. Instead, now, of the lucerne roots feeding on the surface moisture, which is comparatively free from alkalies during a dry spell, the moisture comes up from below, and which, as we have seen, is highly charged with salts, some of which are poisonous to the plant. The largest accumulation of these alkalies is at the depth where the rains penetrate and are retained, which is somewhere about 30 inches from the surface. So long, therefore, as the plant is depending on the rains which fall, but have not reached that depth, growth will proceed satisfactorily. When excessive rains fall, the first effect is to wash these soluble alkalies down through the surface soil, lodging them in the subsoil around the depth mentioned; but when heavy rains continue and percolate right down, forming a connection with the water lying in the subsoil, then the salts lying there become diffused throughout the whole mass, it may be right up to the surface, if the ground is fully saturated, through subsequent evaporation a charge of these salts is left again near the surface, and so on the process is repeated.

Now the remedy for this state of things, and, in fact, the only remedy is underground drainage. In this particular case applications of gypsum will have only a very temporary effect, if indeed any at all. It would only change the salts, not remove them. There is abundance of lime, which ought to mitigate certain of the evils.

The value of drainage lies in this: that when the salts were once washed down through the soil past the bottom of the drains they could never rise again above that level, because, whenever the level of full saturation rises to the bottom of the drains these begin to run, and the water charged with salts is run off.

Drains do not affect the amount of water held by a soil; it is only when a soil receives more water than it can hold that they begin to run. It is possible that underground or tile drainage is not yet readily feasible, but there is no necessity to go that length since open drains will largely effect the object. Such drains should be cut as if for tiles and left open over at least one rainy season. A large quantity of salts would thus be removed. The drains should be about 30 feet apart and 3 feet deep, and should run perpendicular to the slope.

### Chemical Analysis.

|  | Soil. | Sub-soil. |
|--|-------|-----------|
| Hygroscopic Moisture ... ..                | 0.03  | 0.1       |
| Loss on ignition (Organic Matter, etc.)... | 9.3   | 11.2      |
| Soluble Humus ... ..                       | 1.4   | 4.8       |
| Carbonate of Lime ... ..                   | 17.6  | 14.2      |
| Magnesia ... ..                            | 0.8   | 1.3       |

### Mechanical Analysis.

|   | Soil. | Sub-soil. |
|---|-------|-----------|
| Coarse Sand or Gravel ... ..                          | nil   | nil       |
| Sand : Not passing 60 in. mesh ... ..                 | 44.2  | 40.0      |
| Passing 60 in. but not 90 in. mesh ...                | 18.6  | 12.6      |
| Passing 90 in. mesh ... ..                            | 36.5  | 46.3      |
| Further separation of fine earth passing 90 in. mesh. |       |           |
| Fine Sand ... ..                                      | 38.5  | 22.5      |
| Silt ... ..   | 21.5  | 17.5      |
| Fine Silt ... ..                                      | 14.1  | 13.0      |
| Clay... ..  | 15.6  | 36.4      |

## Meteorological Report for the Year ended 31st March, 1907.

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There have been in operation during the past year, or some part thereof, nine barometric, nine thermometric, and thirty-two purely rainfall stations. The total number of rainfall stations is fifty.

### NOTES ON THE VARIOUS STATIONS.

#### BAROMETRIC STATIONS.

The series of observations at the Ayrshire Mine, Salisbury Hospital, Chishawasha and Bulawayo have continued unbroken throughout the period under review.

*Melsetter.*—Maximum and minimum thermometers were forwarded to the observer in July. The former instrument arrived safely, and observations began on 23rd August, 1906. The spirit of the minimum thermometer was, on arrival, found to be broken up into a number of detached portions, and the efforts of the observer to connect these proved unsuccessful; consequently no readings were able to be taken.

At Umtali and Hopefontain there have occasionally been breaks in the continuity of the records, due to absence or indisposition of the observers.

*Empandeni.*—No barometric readings were taken during January, 1907.

*Gwelo.*—It will be remembered that all the thermometers at this station were destroyed by a whirlwind, which felled the Stevenson screen in January, 1906. A set of thermometers was forwarded to this point in July, 1906, but no records reached me until January, 1907, when I learnt from the Civil Commissioner, Gwelo, that Mr. G. Hurtzig had undertaken the duties of observer from 1st December, 1906.

The number of barometric stations is two less than last year. The two stations which have dropped out are Belingwe and Gwanda. At Belingwe the observer, who formerly took the records, left the B.S.A. Police force about April, 1906, and the observations were discon-



tinued for some time. With the co-operation of the Commandant, B.S.A. Police, arrangements have now been made for the regular continuance of observations irrespective of the personnel of the force stationed at Belingwe. The barometer is reported to be out of order.

*Gwanda*.—In my last report it was mentioned that the barometric readings were not often recorded. This, I believed, is not because the instrument is out of order, but through the observations not being taken. Consequently this station now belongs to the third or thermometric order.

### THERMOMETRIC STATIONS.

*Hartley*.—The observations from this station were found to be unreliable, and have not been taken account of this year in the summaries.

*Inyanga*.—Owing to the absence of the observer observations were suspended on 22 days during August, 1906.

In July, 1906, a rain gauge was despatched to complete the equipment of this station, which is now known as Inyanga (Rufurara) to distinguish it from the rainfall station at Inyanga Police Camp.

*Victoria*.—The readings of the new minimum thermometer despatched in July, began on 18th September, 1906.

*Gwanda*.—There is a break in the continuity of the observations from 1st June to 10th August, 1906, due to the serious indisposition of the observer.

*Rhodes Matopo Park*.—Rainfall is shown as from 1st April, 1906, and thermometric readings from 1st January, 1907.

*Sebungwe*.—Observations have only been registered on 90 days during the period under review. During April and May records were taken at Tshete, but the Native Commissioner's Camp was removed later in the year to Kariyangwe, where the records for December and February were taken. The absence of readings for the remainder of the year is due to all the officials being on patrol in the district.

*Tuli*.—There are some few breaks owing to the absence on patrol of the Police who take the observations.

*Victoria Falls.*—This is a new station, which was opened on September 1st, 1906, through the agency of the Transvaal Meteorological Department, who supplied the necessary instruments on learning that this Office had none on hand with which to establish a new station. The Conservator of Forests has undertaken the duties of observer.

Observations have been carried on at the Experimental Farm, Salisbury, and Selukwe, without interruption during the year.

### RAINFALL STATIONS.

The five new stations are Chilimanzi, Driefontein, Inyanga (Rufurara), Rhodes Matopo Park, and the Conservator of Forests' Station at Victoria Falls.

Observations resumed at Shiloh in September, 1906, when the Native Commissioner's Office was re-opened.

### NOTES ON RAINFALL.

The mean rainfall for twenty-eight stations in Mashonaland, which have kept complete records during the year under review, is 36·75 inches with 85 rainy days. During the same period Matabeleland had an average precipitation for fifteen stations of 25·26 inches, with 61 rainy days. For these forty-three stations the normal rainfall amounts to 32·75 inches, with 76 rainy days.

At Helvetia, South Melsetter, 67·44 inches fell on 142 days. This is the greatest known rainfall in Southern Rhodesia. Of this total 25½ inches fell in February alone. Seven stations recorded a precipitation of 40 inches or over, namely, Borrowdale, Chishawasha, Helvetia, Inyanga Police Camp, Melsetter, Umtali and Utopia (Umtali), all in the Eastern province East of longitude 31 degrees. The least rainfall was reported from Tuli, just over 17 inches, which fell on 44 days. In these remarks account has not been taken of those stations whose records are incomplete. In such stations the annual totals are bracketed on Schedule II.

The rainfall last year was, generally speaking, above the normal, but it must be noted that there were certain peculiar features concerning the distribution, which are

remarkable, the chief of which was the occurrence of occasional very heavy tropical downpours throughout the country, which in themselves more than account for the figures being above the average. At ten stations more than 4 inches are recorded as having occurred within 24 hours, namely:—Borrowdale (5'01 inches), Hartman Hill (4'06 inches), Salisbury Hospital (4'10 inches), Inyanga Police Camp (4'09 inches), Rufurara (4'42 inches), Melsetter (4'10 inches), M'Rewa (4'27 inches), Public Gardens and Westridge, Salisbury (4'22 inches), and Bulawayo (4'75 inches).

The rains broke earlier than usual, and the records for October were quite up to the normal. From November the distribution becomes remarkable. In Mashonaland the precipitation was abundant during November and January, deficient in December, and more than bountiful during February, when sudden and copious storms broke over the Province. These continued in the early part of March, but the latter part of this month was practically rainless. In Matabeleland, however, the rains were much above the normal during November and December, plentiful during the two following months, while March was the driest month known. During this last month only four stations out of eighteen recorded more than an inch of rain, while at Shiloh no rain fell at all.

In spite of these vagaries it may be noted that for all economic and agricultural purposes the rainfall was abundant.

Owing to the early commencement of the rains and the greater number of rain days, the temperature was not so high as during the previous year; the extreme maxima being at some stations as much as eight or ten degrees less than during the previous year.

There is no remarkable variation in the atmospheric pressure, while the relative humidity, in sympathy with the rainfall, is generally slightly in excess of that of the previous year.

### TEMPERATURE ON GRASS.

The following comparative statement of the difference of the mean minima readings on grass and in the screen four feet above the ground at Salisbury and Bulawayo for the last two years are interesting:—



| Station.         | Year.  | April. | May. | June. | July. | Aug. | Sept. | Oct. |
|------------------|--------|--------|------|-------|-------|------|-------|------|
| Salisbury ... .. | 1905-6 | 5·6    | 6·1  | 8·8   | 8·7   | 6·9  | 6·2   | 5·6  |
|                  | 1906-7 | 4·5    | 6·7  | 7·6   | 7·6   | 7·1  | 4·6   | 3·2  |
| Bulawayo ... ..  | 1905-6 | 7·8    | 8·6  | 9·3   | 5·6   | 7·2  | 7·0   | 5·8  |
|                  | 1906-7 | 5·5    | 7·1  | 6·4   | 7·1   | 7·3  | 6·8   | 4·1  |

| Station.         | Year.  | Nov. | Dec. | Jan. | Feb. | March. | Year. |
|------------------|--------|------|------|------|------|--------|-------|
| Salisbury ... .. | 1905-6 | 2·9  | 3·1  | 1·9  | *1·6 | 0·9    | 4·6   |
|                  | 1906-7 | 2·5  | 3·2  | 3·0  | 1·5  | 2·7    | 4·5   |
| Bulawayo ... ..  | 1905-6 | 5·0  | 3·6  | 2·7  | 1·3  | 2·6    | 5·5   |
|                  | 1906-7 | 3·4  | 3·1  | 2·3  | 1·4  | 2·5    | 4·7   |

Sign (\*) indicates excess of grass temperature over screen temperature.

It is important to notice that at no time during 1906-7 did the screen temperatures at Salisbury or Bulawayo reach down to freezing point, while on the ground frost was indicated on 25 days in Salisbury and 12 days in Bulawayo during the months of June, July and August.

# SCHEDULE IV.

GENERAL SUMMARY OF RAINFALL COVERING THE FIVE YEARS ENDED 31ST MARCH, 1907.

| NAME OF STATION.                | 1903.   |       | 1904.   |       | 1905.   |       | 1906.   |       | 1907.   |       | Mean Rainfall. |       | No. of years during which observations have been recorded. |
|---------------------------------|---------|-------|---------|-------|---------|-------|---------|-------|---------|-------|----------------|-------|--|
|                                 | Amount. | Days. | Amount. | Days. | Amount. | Days. | Amount. | Days. | Amount. | Days. | Amount.        | Days. |  |
|                                 |         |       |         |       |         |       |         |       |         |       |                |       |  |
| MASHONALAND.                    |         |       |         |       |         |       |         |       |         |       |                |       |  |
| Ayrshire Mine                   | 16.76   | 63    | 40.66   | 111   | 38.43   | 78    | 25.62   | 74    | 28.76   | 82    | 30.26          | 78    | 6  |
| Borrowdale                      | ...     | ...   | ...     | ...   | 33.69   | 77    | 30.52   | 69    | 46.23   | 94    | 36.81          | 80    | 3  |
| Charter                         | ...     | ...   | 28.56   | 76    | 36.70   | 82    | 24.09   | 63    | 29.26   | 73    | 29.65          | 73    | 4  |
| Chishawasha                     | 25.10   | 64    | 36.20   | 101   | 38.67   | 98    | 34.25   | 74    | 45.13   | 102   | 41.19          | 91    | 7  |
| Experimental Farm, Salisbury... | ...     | ...   | ...     | ...   | 33.12   | 92    | 28.51   | 73    | 36.55   | 74    | 32.73          | 79    | 3  |
| Hartley                         | ...     | ...   | 36.38   | 68    | 31.34   | 78    | 27.30   | 60    | 32.15   | 70    | 35.45          | 71    | 6  |
| Hartmann Hill, Salisbury        | 16.78   | 29    | 31.66   | 75    | 27.11   | 60    | 21.39   | 53    | 37.34   | 67    | 29.76          | 57    | 7  |
| Hospital, Salisbury             | 21.12   | 63    | 28.89   | 96    | 32.01   | 92    | 27.90   | 81    | 37.04   | 81    | 32.93          | 88    | 10   |
| Macheke                         | ...     | ...   | ...     | ...   | 37.28   | 88    | 28.44   | 50    | 28.92   | 78    | 31.55          | 72    | 3  |
| Marandellas                     | 26.67   | 48    | 35.00   | 94    | 43.43   | 82    | 32.39   | 51    | 33.69   | 95    | 37.30          | 78    | 6  |
| Melsetter                       | 26.89   | 60    | 55.41   | 100   | 36.72   | 92    | 38.53   | 83    | 45.15   | 109   | 43.62          | 100   | 8  |
| Mount Darwin                    | 21.48   | 45    | 29.64   | 73    | 21.47   | 64    | 20.80   | 53    | 29.00   | 66    | 24.48          | 60    | 5  |
| M'Rewa                          | ...     | ...   | ...     | ...   | 34.52   | 82    | 28.44   | 58    | 38.01   | 81    | 33.65          | 74    | 3  |
| Progress Farm, Marandellas      | ...     | ...   | 34.03   | 83    | 38.46   | 81    | 28.13   | 66    | 34.15   | 78    | 33.69          | 77    | 4  |
| Public Gardens, Salisbury       | 21.94   | 54    | 29.93   | 91    | 33.27   | 82    | 27.64   | 77    | 37.22   | 73    | 30.00          | 75    | 3  |
| Rusapi                          | ...     | ...   | ...     | ...   | 40.25   | 69    | 23.85   | 54    | 32.68   | 99    | 32.26          | 74    | 3  |
| Sinoia                          | ...     | ...   | 23.63   | 79    | 33.53   | 59    | 25.78   | 60    | 31.70   | 78    | 28.66          | 69    | 4  |
| Sipolilo                        | ...     | ...   | ...     | ...   | 25.72   | 79    | 18.65   | 58    | 26.45   | 67    | 23.60          | 68    | 3  |
| Umtali                          | 21.90   | 63    | 33.47   | 102   | 26.37   | 102   | 26.31   | 73    | 43.43   | 110   | 32.51          | 94    | 7  |
| Utopia, Umtali                  | 18.82   | 51    | 38.76   | 112   | 28.29   | 110   | 25.51   | 87    | 40.00   | 118   | 30.27          | 95    | 5  |
| Victoria                        | 21.46   | 41    | 30.57   | 62    | 19.36   | 64    | 25.79   | 56    | 36.04   | 69    | 26.74          | 64    | 6  |
| Westridge, Salisbury            | 23.77   | 58    | 29.90   | 92    | 34.05   | 83    | 27.58   | 77    | 37.34   | 77    | 31.13          | 79    | 6  |

| NAME OF STATION.              | 1903.   |       | 1904.   |       | 1905.   |       | 1906.   |       | 1907.   |       | Mean Rainfall. |       | No. of years during which observations have been recorded. |
|-------------------------------|---------|-------|---------|-------|---------|-------|---------|-------|---------|-------|----------------|-------|--|
|                               | Amount. | Days. | Amount. | Days. | Amount. | Days. | Amount. | Days. | Amount. | Days. | Amount.        | Days. |  |
|                               |         |       |         |       |         |       |         |       |         |       |                |       |  |
| MATEBELELAND.                 |         |       |         |       |         |       |         |       |         |       |                |       |  |
| Belingwe ...                  | 20.02   | 36    | 24.40   | 62    | 19.16   | 42    | 17.67   | 50    | ...     | ...   | 20.94          | 46    | 6  |
| Bulawayo ...                  | 17.94   | 55    | 23.91   | 87    | 17.70   | 65    | 21.22   | 66    | 28.99   | 87    | 23.00          | 75    | 10   |
| Empandeni ...                 | 18.58   | 44    | 21.97   | 56    | 17.81   | 34    | 24.52   | 54    | 20.31   | 46    | 21.76          | 48    | 7  |
| Filabusi ...                  | ...     | ...   | 22.04   | 75    | 18.80   | 47    | 19.04   | 49    | 19.28   | 58    | 19.79          | 57    | 4  |
| Fort Rixon ...                | ...     | ...   | ...     | ...   | 18.66   | 48    | 15.20   | 49    | 22.55   | 60    | 18.80          | 52    | 3  |
| Government House, Bulawayo... | ...     | ...   | ...     | ...   | 15.67   | 41    | 24.51   | 51    | 24.57   | 57    | 21.58          | 49    | 3  |
| Gwelo ...                     | 19.62   | 57    | 27.04   | 72    | 18.81   | 55    | 17.41   | 58    | 19.92   | 78    | 24.76          | 72    | 7  |
| Hopefountain ...              | 24.68   | 62    | 25.27   | 78    | 23.01   | 77    | 24.19   | 66    | 30.47   | 77    | 26.65          | 77    | 9  |
| Inyati ...                    | ...     | ...   | 23.81   | 51    | 22.57   | 58    | 22.08   | 53    | 22.99   | 53    | 22.86          | 54    | 4  |
| Sebungwe...                   | 20.97   | 54    | 29.74   | 56    | 26.83   | 61    | 26.44   | 54    | ...     | ...   | 25.99          | 50    | 4  |
| Selukwe ...                   | ...     | ...   | 43.59   | 73    | 43.58   | 71    | 31.98   | 68    | 39.04   | 70    | 39.54          | 70    | 4  |
| Shiloh ...                    | ...     | ...   | 28.83   | 70    | 22.02   | 51    | ...     | ...   | 23.97   | 49    | 24.94          | 56    | 3  |
| Tegwani ...                   | 16.79   | 56    | 17.83   | 57    | 18.55   | 35    | 22.04   | 41    | 24.47   | 48    | 19.93          | 47    | 5  |
| Tuli ...                      | 16.87   | 37    | 15.29   | 24    | 13.02   | 22    | 12.01   | 28    | 17.07   | 44    | 14.79          | 34    | 9  |
| Westacre ...                  | 17.74   | 31    | 20.10   | 45    | 17.35   | 41    | 22.07   | 42    | 28.13   | 41    | 21.07          | 40    | 5  |



## Customs Returns.

TABLE SHOWING SOME OF THE PRINCIPAL IMPORTS OF AN AGRICULTURAL NATURE INTO SOUTHERN RHODESIA FROM OVERSEA, AND ALSO FROM OTHER STATES IN THE UNION, FOR TWELVE MONTHS ENDED DECEMBER 31ST, 1906.

### *Animals—Living:—*

|                                     | No.    | Value.  |
|-------------------------------------|--------|---------|
| Horses, mares and geldings ... ..   | 299    | £8,375  |
| Bulls, oxen, cows and calves ... .. | 288    | 1,680   |
| Donkeys, jackasses and mules ... .. | 560    | 10,579  |
| Sheep and goats ... ..              | 11,404 | 12,791  |
| Pigs ... ..                         | 2      | 1       |
| Poultry ... ..                      | 12,604 | 756     |
| All other kinds ... ..              | —      | 2,334   |
| Total ... ..                        | —      | £36,516 |

### *Foods, etc.*

|  | £      |
|--|--------|
| Butter, margarine, etc. ... ..               | 12,486 |
| Cheese ... ..                                | 3,635  |
| Jams and jellies ... ..                      | 4,414  |
| Maize ... ..                                 | 20,221 |
| Maize Meal ... ..                            | 11,148 |
| Oats ... ..                                  | 3,093  |
| Wheat flour or meal ... ..                   | 34,932 |
| Flour or meal ground from imported wheat ... | 613    |
| Rice, including paddy ... ..                 | 13,649 |
| Bran ... ..                                  | 1,462  |
| Eggs ... ..                                  | 2,368  |
| Fruit, all sorts ... ..                      | 16,240 |
| Beef ... ..                                  | 817    |
| Mutton ... ..                                | 877    |
| Poultry and game ... ..                      | 405    |
| Meat (salted or cured, chiefly bacon) ... .. | 10,479 |
| Meat (tinned or preserved) ... ..            | 17,454 |
| Milk or cream (condensed) ... ..             | 12,231 |
| Onions ... ..                                | 2,340  |
| Potatoes and seed ... ..                     | 6,096  |
| Vegetables (tinned) ... ..                   | 1,203  |
| Other fresh vegetables ... ..                | 50     |

|  |        |
|--|--------|
|  | £      |
| Tobacco (including cigarettes, cigars and snuff) | 29,680 |
| Lard   | 2,352  |
| Tea  | 6,288  |
| Sugar and sugar products                         | 15,195 |
| Coffee   | 4,973  |
| Oils—salad, castor and linseed                   | 1,803  |
| <i>Hay and Fodder</i>                            | 663    |

NOTE.—The prices given are prices at the place of origin.  
About 70 per cent. would have to be added on to arrive at their actual cost here.

## **Epitome of Cattle Inspectors' Returns.**

MAY, 1907.

### **SALISBURY.**

#### *African Coast Fever.*

Fresh Outbreaks: None.

Existing Outbreaks: No deaths.

#### *Rabies.*

One suspected case.

#### *Horse Sickness.*

The mortality still continues to be very heavy.

### **BULAWAYO.**

#### *African Coast Fever.*

Fresh Outbreaks: None.

Existing Outbreaks: A recrudescence of this disease has occurred at Sibotela's Kraal on "Emangani" farm. This kraal is situated within a mile of Magomfis and Bunkayi Kraals, where the disease occurred last June. The healthy cattle will be removed to the fenced area Essexvale. Up to the present nine deaths have occurred.

#### *Glanders.*

The following animals were tested with Mallein and found healthy:—Donkeys, 16; Mules, 50; Horses, 34; Zebra, 1—total, 101.

## UMTALI.

### *African Coast Fever.*

Fresh Outbreaks: None.

Existing Outbreaks: No deaths.

### *Rabies.*

Two cases occurred.

## GWELO.

### *African Coast Fever.*

Fresh Outbreaks: None.

Existing Outbreaks: No deaths.

## VICTORIA.

### *African Coast Fever.*

Fresh Outbreaks: None.

Existing Outbreaks: Only one death reported due to Coast Fever.

JUNE, 1907.

## SALISBURY.

### *African Coast Fever.*

Fresh Outbreaks: None.

Existing Outbreaks: No deaths.

### *Horse Sickness.*

The mortality still continues to be very heavy.

## BULAWAYO.

### *African Coast Fever.*

Fresh Outbreaks: None.

Existing Outbreaks: A recrudescence of this disease has occurred at the old-infected area at Nsingwani, through cattle gaining access to the infected veld. A police cordon has been placed around a wide area, and a large staff of the Veterinary Department has been sent with instructions to pass all the cattle through temperature camps, infected herds being driven inwards and the clean outward. Fencing is in progress, and proceeding as fast as the infected zone is definable.



*Glanders.*

The following animals were tested with Mallein and found healthy:—Horses, 147; mules, 75; donkeys, 21. Total, 243.

GWELO.

*African Coast Fever.*

Existing Outbreaks: No deaths.

Fresh Outbreaks: None.

UMTALI.

*African Coast Fever.*

Fresh Outbreaks: None.

Existing Outbreaks: No deaths.

*Rabies.*

Two suspected cases occurred.

*Scab.*

Eleven flocks remain under licence.

*Horse Sickness.*

Three horses and two uninoculated mules have died.

VICTORIA.

*African Coast Fever.*

Fresh Outbreaks: None.

Existing Outbreaks: Thirty animals were destroyed. Seven cows and 17 calves died from the result of the cold spell of weather, old age, and debility. The number includes some motherless calves.

MELSETTER.

*African Coast Fever.*

Fresh Outbreaks: None.

Existing Outbreaks: No deaths.

E. M. JARVIS,

Acting Chief Veterinary Surgeon.

## **SOUTH AFRICAN STUD BOOK.**

A RECORD of all classes of Stock, the object being to encourage the breeding of Thoroughbred Stock and to maintain the purity of breeds, thus enhancing their value to the individual owner and to the country generally.

Applications for Membership and entries of Stock should be addressed :

For Cape Colony to—

J. PIKE, P.O. BOX 703, CAPE TOWN.

For Transvaal to—

F. T. NICHOLSON, P.O. BOX 134, PRETORIA.

For Orange River Colony—

E. J. MACMILLAN, GOVERNMENT BUILDINGS,  
BLOEMFONTEIN.

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The South African Stud Book Volume is obtainable of

**T. MASKEW MILLER,**

***Adderley Street, CAPE TOWN.***

**PRICE 10/6**

---

J. PIKE,  
Secretary South African  
Stud Book Association.

## Government Notices.

No. 42 of 1907.

Department of Agriculture,

Administrator's Office,

Salisbury, 28th February, 1907.

### RABIES.

**U**NDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby declare and make known that, on and after the 15th day of March, 1907, all and singular the Government Notices regarding the disease of Rabies now subsisting and in force in this Territory are hereby cancelled and repealed, except as to acts done or penalties incurred at the date of the coming into force of this Notice, and except as to officers appointed under Government Notice No. 286 of 1906, whose appointments shall remain valid for the purposes of this Notice, and in lieu thereof the following regulations shall have full force and effect:—

1. All and several the various Native Districts of Southern Rhodesia are hereby declared to be areas infected with the disease of Rabies.

2. Subject to any penalty a dog owner may have incurred under Government Notice No. 285 of 1906 by not registering his dog before the 1st day of February, 1907, the owner of any unregistered dog liable to registration may register the same at any time after the said date.

3. On and after the date of this Notice becoming operative the owner of every dog arriving at the age of three months, and the owner of every dog imported into Southern Rhodesia after that date shall register such dog with an official appointed for the purpose, provided that this provision shall not apply to any Municipality, Township or similar area in which provision for registration exists and is duly enforced.

4. A registration badge shall be issued for each and every dog registered, and the said badge must be attached to a proper and sufficient collar to be supplied by the owner, which must be placed and kept on each dog registered.

5. A fee to cover the cost of registration and supply of the badge in the amount of sixpence will become demandable and payable on registration of each dog.

6. Any dog found at large after the date of this Notice becoming operative, not having and bearing a registration badge duly issued by an official or the local authority, may be summarily destroyed by any person.

7. Every dog shall be kept muzzled with a standard wire muzzle made according to the pattern lodged with each Magistrate and Assistant Magistrate, and open to inspection on application to him, or with a muzzle sufficient to prevent its biting or injuring any person or other animal with its teeth, or shall be secured in an enclosure or by chain in such a manner that it shall not have access to persons or animals nor other animals access to it.

8. Every dog found at large after the 15th day of March, 1907, not being sufficiently muzzled, may be summarily destroyed by any person, and the owner or person responsible for the custody of such dog shall be liable to the penalty hereinafter prescribed.

9. Any Magistrate, Police Officer, Native Commissioner, Government Veterinary Surgeon or other official vested with the performance of functions under the Animals Diseases Consolidation Ordinance, 1904," may, on it appearing to him that any dog or other animal is showing symptoms which justify investigation as to whether such dog or animal is suffering from rabies or not, order the proper detention, isolation and control of such dog or animal either in the hands of the owner or at some other suitable place.

10. Should any dog show symptoms which lead to the suspicion that such dog may be suffering from rabies, the owner thereof shall forthwith notify the fact to the nearest official vested with powers under these regulations, who shall immediately report same to the Chief Veterinary Surgeon, and shall either destroy the said dog or isolate and secure it for further observation.



11. On its appearing that any animal is actually suffering from rabies, any of the above-mentioned officials may order the destruction of such animal, or may himself destroy it and may further take control of or destroy, if deemed necessary, any animal which has been in contact with a rabid animal or an animal suspected of being rabid.

12. The carcasses of all animals destroyed on account of their being infected with rabies shall be thoroughly burnt by the person or official destroying them, save that such parts as may be required for scientific investigation may be retained under proper precautions. In any case in which a human being has been bitten by a rabid animal, the head of such animal shall, if possible, be taken and sent to the nearest Veterinary Official.

13. Any person contravening any of the above regulations or failing to carry out any of the provisions thereof shall be liable on conviction to a fine not exceeding £10 for each offence or in default of payment to imprisonment with or without hard labour for a period not exceeding one month.

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No. 156 of 1907.

#### RABIES.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby declare and make known that on and after 15th August, 1907, Sections 7 and 8 of Government Notice No. 42 of 1907 are repealed and the following new Sections substituted:—

7. Every dog shall be kept muzzled with a standard wire muzzle made according to the patterns lodged with each Magistrate and Assistant Magistrate, and open to inspection on application to him, or shall be secured in an enclosure or by chain in such a manner that it shall not have access to persons or animals nor other animals access to it.

8. Every dog found at large after the 15th day of August, 1907, not being muzzled with a standard wire muzzle may be summarily destroyed by any person, and the owner or person responsible for the custody of such dog shall be liable to the penalty prescribed in the aforesaid Government Notice.

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No. 157 of 1907.

#### IMPORTATION OF PLANTS, &c., REGULATIONS.

UNDER and by virtue of the powers in me vested by the "Importation of Plants Regulation Ordinance, 1904," I do hereby declare that until further notice no person shall introduce into this Territory from the area of Cape Colony, lying East of and including the Division of George, Oudtshoorn, Uniondale, Willowmore, Aberdeen, Murraysburg, Richmond, Britstown, Hopetown, Herbert and Kimberley, any nursery stock, ornamental plants and shrubs, fruit, vegetables or portions thereof.

If at any time an Inspector shall find any tree, plant, fruit, vegetable or portion thereof imported into this Territory in contravention of the above Regulation, he shall order the same to be immediately removed from the Territory, or the Secretary for Agriculture may order such to be destroyed without delay.

All permits for the introduction of nursery stock from the aforesaid areas, which have been granted under Section 16 of Government Notice No. 141 of 1906 shall be and are hereby cancelled.

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No. 91 of 1907.

#### "GAME LAW CONSOLIDATION ORDINANCE, 1906."

UNDER and by virtue of the powers conferred on me by the "Game Law Consolidation Ordinance, 1906," I do hereby declare that the following Locust Birds:—

- (1) Great Locust Bird or White Stork (*Ciconia alba*).
- (2) Lesser Locust Bird or Nordmann's Pratincole (*Glareola melanoptera*).
- (3) Small White Heron or Cattle Egret (*Bubulcus ibis*).
- (4) Wattled Starling (*Dilophus carunculatus*).

are added to Class "A" of the said Ordinance, and shall henceforth be strictly protected, and not hunted or destroyed throughout Southern Rhodesia.

No. 237 of 1906.

## GAME LAW CONSOLIDATION ORDINANCE, 1906: CLOSE SEASON, &amp;c.

UNDER and by virtue of the powers conferred upon me by the "Game Law Consolidation Ordinance, 1906," I do hereby cancel and withdraw all notices relating to game preservation and issued in terms of "The Game Preservation Ordinance, 1899," and declare the following to be of force and effect in lieu thereof:—

## CLOSE SEASON.

1. In the whole of Southern Rhodesia, the close season for game in Class "A" shall be from 1st November to 30th April in each year.
2. In the whole of Southern Rhodesia, the close season for game in Class "B" shall be from 1st December to 30th June in each year.
3. Up to 31st March, 1908, the following game shall be strictly protected and not hunted or destroyed within the respective areas mentioned:—

- (a) Oribi, within the magisterial district of Charter.
- (b) Grysbok, within the magisterial district of Bulawayo.
- (c) Koorhaan, throughout Southern Rhodesia, except the magisterial districts of Charter and Victoria.
- (d) All game within the limits of the commonages or townlands of Salisbury, Bulawayo, Umtali, Gwelo and Enkeldoorn.

4. The operation of Section 12 of the said Ordinance shall be suspended in regard to Class "A" up to 31st December, 1907, and Class "B" up to 30th June, 1907, from date hereof within the magisterial district of Melsetter.

5. That the operations of Sections 5 and 12 of the said Ordinance shall be suspended in regard to all game in Classes "B" and "C," except Ostrich, Elephant, Zebra, Hippopotamus, Rhinoceros, black and white; and all such of the Antelope species as are not contained in Classes "B" and "C" of the said Ordinance within the limits described in the schedule hereto, as to the districts of Hartley and Lo Magondi.

6. All game is strictly preserved and shall not be hunted or destroyed until further notice within the following area, which is declared a game sanctuary:—

An area in the Urungwe Sub-district of the District of Lo Magondi in the Province of Mashonaland, bounded as follows:—

On the North and West by the River Zambesi, starting at the point where the Loenzi River joins the Zambesi and following the course of the latter river to its junction with the Sanyati River.

On the East by an imaginary line drawn from the junction of the Indurume and the Nyaodsa Rivers to the headwaters of the Loenzi River and thence along the course of the Loenzi River to its junction with the Zambesi River.

On the South by an imaginary line drawn due West from the point of junction of the Indurume and Nyaodsa to the Sanyati River, thence along the course of this river to where it enters the Zambesi.

## SCHEDULE.

1. Hartley District.—Along the North side of the Railway from Umfuli Bridge to Umzwezwe Bridge, thence along the Umzwezwe River to its junction with the Umnyati, thence along the Umnyati to its junction with the Umfuli, along the Umfuli to its junction with the Umsengezi, up the Umsengezi to the Hartley-Lo Magondi footpath crossing near Madzorera Kraal, thence along the Hartley-Lo Magondi footpath to Umfuli Bridge.

2. The whole of the Lo Magondi district except within the limits declared a game sanctuary under Section 6 hereof.

No. 187 of 1906.

26th July, 1906.

## IMPORTATION OF CATTLE.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby declare and make known that notwithstanding any general prohibition against the importation of cattle into this Territory such importation will be allowed under the following conditions:—

1. Cattle *bona fide* required for breeding purposes may be introduced from the Cape Colony provided that the permission of the Chief Inspector of Cattle is first obtained.

2. Every application for such permission shall be accompanied by a certificate in form A hereunto annexed.

3. Cattle introduced from the Cape Colony shall have not more than two permanent central incisor teeth: they shall be introduced by rail only and shall upon and after arrival at the importer's farm or at their destination be effectually isolated from all other cattle for such period as may be directed by the Chief Inspector of Cattle.

4. Cattle may be imported from North-Eastern Rhodesia provided that

(a) The permission of the Chief Inspector of Cattle be first had and obtained, which permission the said official shall have full discretion to refuse.

(b) All cattle be introduced by way of the port or town of Feira, which is hereby declared a port of entry for cattle, and taken to Sipolilos.

(c) Such cattle be submitted for inspection and passed by a duly authorised officer at Feira and at Sipolilos and such inspection be noted on the permit originally granted.

5. On and after the 1st day of November, 1906, Cattle may be imported from North-Western Rhodesia provided that,

(a) The permission of the Government Veterinary Surgeon at Bulawayo be first had and obtained, which permission the said official shall have full discretion to refuse.

(b) All Cattle imported shall be conveyed by the shortest possible route to the Railway Station at Victoria Falls, which is hereby declared a port of entry for cattle, and shall there be entrained and conveyed by rail to the centre of consumption.

(c) On arrival at their destination such cattle shall be subject to all the regulations controlling the movement and disposal of slaughter cattle.

6. Every application for permission to introduce cattle from North-Eastern and North-Western Rhodesia shall be accompanied by a certificate in the form B annexed to this notice.

7. Cattle may be imported from Great Britain or Ireland, provided

(a) That every animal so imported is accompanied by a proper and satisfactory certificate signed by a qualified Veterinary Surgeon that such animal was submitted to and resisted the tuberculin test for tuberculosis either before being embarked or upon arrival in port, or

(b) That if such certificate be not produced every animal so imported shall be submitted to such quarantining and testing for tuberculosis as may be directed or approved by the Chief Inspector of Cattle.

(c) That in the event of any test ordered and made disclosing the existence of tuberculosis the animal infected shall not be removed alive from the place where quarantined, but shall be there killed, and the owner shall be allowed to deal with the carcase as he may deem fit except that he shall not without special permission from a Government Veterinary Surgeon allow the meat to be used for human consumption.

(d) And that all of expenses of inspection, quarantine, testing, destruction or disposal shall be borne by the owner of such cattle.



8. Any person introducing cattle into Southern Rhodesia otherwise than in accordance with these regulations or submitting any certificate false in any material particular or refusing or neglecting to submit cattle introduced to proper inspections and tests, or failing to properly isolate such cattle when introduced shall be liable to a fine not exceeding £10 for every animal in connection with which the offence complained of is committed and in default of payment of any fine inflicted to imprisonment with or without hard labour for any period not exceeding three months and the cattle in regard to which the complaint has been laid and proved shall be liable to destruction without compensation.

#### ANNEXURE "A."

I certify that the animals enumerated below have been in my possession since birth, and that Lungsickness, Contagious Pleuro-Pneumonia or any other contagious or infectious disease has not existed amongst any of my cattle or on my farm within the last three years, and that such cattle in travelling to.....Station will not come in contact with any animals amongst which Lungsickness or any other infectious or contagious disease has existed during that period.

Signature.....

The above mentioned facts are to my knowledge true and correct.

Date.....

Resident Magistrate.

.....District.

Cape of Good Hope.

Number of Animals..... Bulls..... Heifers.....

Breed.....

Seller's name and address.....

Purchaser's name.....

Place in Rhodesia to which animals are being sent.....

#### ANNEXURE "B."

I certify that the animals enumerated below have been in my possession for twelve months, and that no case of Lungsickness or other contagious disease has occurred amongst them or other cattle with which they have been in contact, and that in travelling to Feira (or Victoria Falls) they will not come in contact with any cattle amongst which Lungsickness or other contagious disease has existed during the last two years.

Signature.....

The above mentioned facts are to my knowledge true and correct.

Magistrate, District Commissioner, or J.P.

N.E. Rhodesia.

N.W. Rhodesia.

Date..... District.....

Number of Animals..... Bulls..... Cows.....

Heifers..... Bullocks.....

Breed.....

Seller's name.....

Purchaser's name.....

Place in Southern Rhodesia to which animals are being sent.....

No. 188 of 1906.

26th July, 1906.

## AFRICAN COAST FEVER.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel and withdraw the regulations promulgated by Government Notices Nos. 264 of 1905 and 164 of 1906 and declare the following to be of full force and effect in lieu thereof within the Province of Matabeleland, exclusive of the District of Gwelo as described and defined by section 4 (c) of the "Southern Rhodesia Boundary Regulations Amendment Regulations, 1898," which area is hereby declared to be an area infected with a destructive disease and is hereinafter called the said area.

1. No cattle shall be moved from any other part of the Territory of Southern Rhodesia into the said area.

2. The movement of cattle to, from, or across any defined area appearing in the schedule hereto or any area which may hereafter be added to that schedule so long as such area remains in and is not withdrawn from the schedule is absolutely prohibited save and except as is provided for in sections 3, 6 and 7 of these regulations.

3. The movement of all cattle within the said area is prohibited save and except

- (a) On permission granted by an Officer specially authorised thereto by the Administrator.
- (b) Within the boundaries of any single farm where such cattle are depastured.
- (c) Within an area of land enclosed by a substantial fence.
- (d) Within a radius of four miles of any native kraal situate within the boundaries of any Native Location or Reserve, and as is hereinafter further provided.

4. The movement of cattle for slaughter, *bona fide* farming, mining or breeding purposes or for private milk supplies shall be permitted under the written authority of an official thereto duly authorised subject to the following terms and conditions:

- (a) That cattle are moved to the nearest or most suitable railway station or siding, and thence by rail to their destination, or, where the district is not served by a railway by the most suitable route to their destination, all cattle travelling by road shall be under the personal supervision of a responsible white man approved of by the Cattle Inspector or of a native approved of by the Native Commissioner and the Cattle Inspector of the district within which the movement takes place.
- (b) That written permission of owners, occupiers or managers of all occupied land, and in the case of Native Reserves, of the Native Commissioner of the District over which such cattle shall pass to the nearest station, siding or destination is obtained; provided that in the event of such owners, occupiers, managers or Native Commissioner refusing to grant such permission, the Controller of Stock may direct the issue of a permit of removal, if satisfied that the necessary permission is withheld without good and sufficient cause.
- (c) That such cattle shall before being moved, be thoroughly disinfected by dipping or by spraying to the satisfaction of the Officer issuing permit, and at the expense of the owner of such stock, and if intended for slaughter shall where possible be branded under the supervision of the Officer issuing permit with the letters "V.D." on the near side of neck.
- (d) That cattle intended for slaughter shall, on arrival at destination subject to the terms of clause (e) hereof, be immediately taken to the prescribed quarantined area and there be quarantined and confined, and where not branded in terms of clause (c) hereof, be similarly branded under the supervision of a duly authorised officer.
- (e) That all cattle intended for slaughter brought to their destination and not disinfected by dipping or spraying in terms of clause (c) hereof shall be immediately taken to the public dipping station and there be thoroughly dipped or sprayed before being taken to the quarantine area.

- (f) That all cattle admitted to the quarantine area shall be slaughtered within twenty-one days of their admission, and under no pretext whatever shall cattle so admitted be permitted to leave the said area alive; all such cattle shall after admission to the said area be considered as likely to be infected with disease and if found wandering outside the said area or in possession of any person may be destroyed under an order of the Chief Inspector or Controller of Stock.
  - (g) That on arrival at destination cattle other than slaughter cattle shall be dipped or sprayed and shall be effectually isolated from all other cattle on the same land for a period of four weeks.
5. The movement of working cattle may be permitted under the following conditions only:—
- (a) Within a radius of six miles of any working mine or mine in course of development for the purposes of such mine, provided that such cattle shall only be moved under a permit of a duly authorised officer, and shall be dipped every fourteen days or where no dipping tank is available be thoroughly sprayed with an approved dip, provided further that such permission shall not be granted when it conflicts with any other section of these regulations, or if such movement is considered dangerous to other cattle within the six mile radius.
  - (b) Within the said area from private farms and trading stations to any centre of consumption or to a Railway Station or Siding within the said area under the permit of a duly authorised officer, which permit shall fully set forth the route to be traversed, provided that no such permit shall be issued until the person applying for same shall produce the written consent of the owners, occupiers or managers of occupied lands proposed to be traversed, and, in the case of Native Reserves, of the Native Commissioner, and that such cattle shall before being moved be thoroughly disinfected by dipping or spraying at the expense of the owner and to the satisfaction of the Officer issuing the permit; provided further that in the event of such consent being unreasonably withheld, the Controller of Stock may direct the issue of a permit.
6. In the event of the failure of pasturage or water on land on which cattle are located, the movement of such cattle will be permitted, provided:—
- (a) That such movement shall be to nearest available pasturage by the most suitable route.
  - (b) That written consent be obtained in terms of Section 4 (b) hereof.
  - (c) That movement shall be by permit only of a duly authorised officer, and under the supervision of a responsible white man, or of a native approved of by the Cattle Inspector and Native Commissioner of the district.
7. For the purposes of cleansing an area from disease the Controller of Stock may, on the authority of the Administrator and on the advice of the Chief Inspector of Cattle, and subject to such conditions as may be stipulated, permit the removal of cattle from a scheduled area to an adjacent clean area.
8. All applications for the removal of cattle under sections 4 and 5 hereof shall be submitted to and approved of by the Veterinary Department before being granted and when such movement is from one Native District to another the application shall be submitted for the approval of the Government Veterinary Surgeon at Bulawayo and the Native Commissioners of the Districts to and from which the removal is made.
9. All permits granted under the provisions of this notice shall specify the number and brands of cattle, route to be traversed, and time allowed for each journey; any breach of these or other conditions endorsed on the permit by the issuing officer shall be deemed a contravention of these Regulations in terms of section 14 hereof.
10. All veld-fed animals within the limits of the various Commonages or Townlands or other centres where there is common grazing ground, and wherein cases of African Coast Fever have occurred within two years of the date of publication hereof, and upon which public dipping tanks have been established, shall be dipped therein at least once every fourteen days: provided that the Controller of Stock may, on the advice of the Veterinary De-



partment, direct the temporary suspension of this regulation for such reasons as he may regard as sufficient.

11. The following charges shall be paid at the time of dipping by the owner of the cattle or other animals required to be dipped under these Regulations in respect of any dipping done at a public dipping tank :—

|   |               |
|---|---------------|
| For cattle (over six months) .. .. .      | 3d. per head. |
| For horses and mules .. .. .              | 3d. „         |
| For calves (six months and under) .. .. . | 2d. „         |
| For small stock .. .. .                   | ½d. „         |

with a minimum charge of 6d. for any number of animals not aggregating such fee under above tariff.

12. Any disinfecting by spraying required to be done under these regulations shall be carried out with an approved insecticide by the owner of the animals so sprayed ; provided that the Inspector may, at his discretion, carry out such disinfection with the assistance of and at the entire cost of the owners of the animals to be sprayed, the cost of such disinfection being payable at the time of the spraying.

13. Whenever the owner, occupier, or manager of a farm shall adopt measures for the cleansing of his cattle running thereon, either by spraying or dipping or by any other method permitted by these or any other regulations, the Cattle Inspector may order such natives or others as have cattle on the said farm to cleanse such cattle, and the Native Commissioner of the District in which such farm is situated may enter into an arrangement with the native owners of cattle to cleanse such cattle at a charge to be mutually agreed between the said owner, occupier, or manager and the said native owners.

14. Any person contravening any of the provisions of these regulations shall, upon conviction, be liable in respect of each offence to the fines and punishments prescribed by the Ordinance, and in cases where no special punishment is provided, to a fine not exceeding £20, or in default of payment to imprisonment with or without hard labour for any period not exceeding three months, unless the penalty be sooner paid.

#### SCHEDULE.

- (1) Fingo Location.
- (2) An area within a radius of ten miles of Ntolas Kraal on the farm Emangeni.
- (3) An area comprising the farms Upper and Lower Umvutcha, Reigate, Upper Nondwene, Mapane, Government Farm No. 5, Trenance and the plots adjoining the farms Umvutcha.

No. 189 of 1906.

26th July, 1906.

#### AFRICAN COAST FEVER.

UNDER and by virtue of the powers vested in me by the "Animals Diseases Consolidation Ordinance, 1904," I do hereby cancel and withdraw the regulations promulgated by Government Notices Nos. 223 of 1905 and 115 of 1906, and declare the following to be of full force and effect in lieu thereof within the Province of Mashonaland and the Fiscal Division of Gwelo as defined by the "Southern Rhodesia Boundary Regulations Amendment Regulations, 1898," which areas are hereby declared to be areas infected with a destructive disease :—

1. The movement of all cattle within the said area is prohibited save and except :—

- (a) On permission granted by an officer specially authorised thereto by the Administrator.
- (b) Within the boundaries of any single farm where such cattle are depastured.
- (c) Within any area of land enclosed by a substantial fence.
- (d) Within a radius of four miles of any native kraal situate within the boundaries of any native location or reserve and as is hereinafter further provided.

2. The movement of cattle for slaughter purposes shall be permitted under the written authority of an officer thereto duly authorised, subject to the following terms and conditions :—

- (a) That such cattle are moved to the nearest or most suitable railway station or siding, and thence by rail to the centre of consumption

- or, where the district is not served by a railway, by the most suitable route to the centre of consumption, all cattle travelling by road to be under the personal supervision of a responsible white man approved of by the Cattle Inspector, or of a native approved of by the Native Commissioner and the Cattle Inspector of the district within which such movement takes place.
- (b) That the written permission of owners, occupiers or managers of all occupied land, and, in the case of Native Reserves, of the Native Commissioner of the District over which such cattle shall pass to the nearest station, siding or centre of consumption is obtained: provided that in the event of such owners, occupiers, managers, or Native Commissioners refusing to grant such permission, the Controller of Stock may direct the issue of a permit of removal if satisfied that the necessary permission is withheld without good and sufficient cause.
  - (c) That such cattle shall, before being moved, be thoroughly disinfected by dipping, or spraying, to the satisfaction of the officer issuing permit, and at the expense of the owner of such stock; and where possible, be branded under the supervision of the officer issuing permit with the letters "V.D." on near side of the neck.
  - (d) That such cattle shall, on arrival at the centre of consumption, subject to the terms of Clause (e) hereof, be immediately taken to the prescribed quarantine area and there be quarantined and confined and, where not branded in terms of Clause (c) hereof, be similarly branded under the supervision of a duly authorised officer.
  - (e) That all cattle brought into any centre of consumption and not disinfected by dipping or spraying in terms of Clause (c) hereof shall be immediately taken to the public dipping station and there be thoroughly dipped or sprayed before being taken to the quarantine area.
  - (f) That all cattle admitted to the quarantine area shall be slaughtered within twenty-one days of their admission, and under no pretext whatever shall cattle so admitted be permitted to leave the said area alive. All such cattle shall, after admission to the said area, be considered as likely to be infected with disease, and, if found wandering outside the said area or in possession of any person, may be destroyed under an order of the Chief Inspector or Controller of Stock.
3. The movement of cattle required for *bona fide* mining, farming, breeding and dairying purposes, and for private milk supplies, may be permitted on the written authority of a duly authorised officer, subject to the following terms and conditions:—
- (a) That such movement shall take place subject to the conditions set forth in Section 2, clauses (a), (b) and (c): provided that it shall not be necessary to brand such cattle as required by Clause (c).
  - (b) That on arrival at destination such cattle shall be effectually isolated from all other cattle on the same land for a period of four weeks.
  - (c) That the consent in writing to such movement be obtained from all owners of cattle on farms adjoining that to which movement takes place, and in the case of Native Reserves, of the Native Commissioner of the district, provided that should such consent be unreasonably withheld by any of the aforesaid persons, the Controller of Stock may direct the issue of a permit.
  - (d) That such cattle required for breeding and dairying purposes or for private milk supplies, when moved to within the boundaries of the various commonages, town lands, or of grazing land common to any mining camp or other centre where cases of African Coast Fever have occurred within two years, shall, if deemed necessary by the Chief Inspector of Cattle, be confined in some enclosed place approved of by the local Cattle Inspector, and, if a case of African Coast Fever occur in such enclosure, shall not be liberated therefrom except in terms of Section 4, Clause (b) hereof, until twelve months after the last occurrence of African Coast Fever within the enclosure in which they are kept, nor shall they be allowed after liberation to run upon any of the land specified herein, unless such land has been free from African Coast Fever for a period of twelve months.

- (c) All cattle introduced in terms of the preceding Sub-section (d) shall, on arrival, if not previously disinfected in terms of Section 2, Clause (c), be taken direct to the Government dipping station and dipped or sprayed.
  - (f) All cattle confined in terms of this section and all calves born within the said enclosures shall be sprayed every fourteen days as may be directed by the Cattle Inspector.
  - (g) No cattle shall be moved from one Native District to another unless with the permission of the Chief Inspector of Cattle and the Native Commissioners of the districts to and from which such movement takes place.
4. All calves under twelve months old running within the boundaries of the various commonages, town lands, or on grazing ground common to any mining camp or other centres where cases of African Coast Fever have occurred within twelve months of the date of these regulations, or born thereon after such date, shall be removed to some enclosed place approved of by the local Cattle Inspector, and shall not be liberated or allowed to run at large on such commonage, town lands or common grazing ground until twelve months after the occurrence of the last case of African Coast Fever within the enclosure in which they are confined or upon such commonage, town lands or common grazing ground.
- (a) No calves shall be permitted to accompany working cattle travelling, and all calves born of such working cattle whilst travelling shall not be removed from the place where born.
5. For the purpose of cleansing an area of disease, the Controller of Stock may, under the authority of the Administrator and on the advice of the Chief Inspector of Cattle, subject to such conditions as may be stipulated, permit the removal of calves and other cattle to an adjacent clean area.
6. The movement of working cattle other than those specified in Section 7 hereof, may be permitted within the following areas and on the terms and conditions hereinafter set forth :—
- (a) Within a radius of ten miles of any working mine, or mine in course of development, for the purposes of such mine : provided that
    - (1) Such cattle shall only be moved under permission of a duly authorised Officer, and shall be dipped every fourteen days where a dipping tank is available within such area, or, in the absence of a dipping tank, be thoroughly sprayed with an approved insecticide ;
    - (2) That such permission shall not be granted where it conflicts with any other section of these regulations, or, if such movement is considered to be dangerous to other cattle within the ten mile radius.
  - (b) Within the boundaries of the following Native Districts, viz., Lomagundi, Marandellas, M'Rewas, M'Tokos, Makoni, Hartley, Inyanga, North and South Mazoe, Charter and Gwelo, as defined by Government Notice No. 13 of 1899, and from the farms "Shitowa" and "Soul Prop" to the Chiodzani Drift situate in the Umtali District, for *bona fide* farming purposes, subject to the following conditions :—
    - (1) That the movement will be permitted for such period as the Controller of Stock may in his discretion, and on the advice of the Chief Inspector of Cattle, deem expedient, provided that such permission may at any time be withheld or withdrawn without notice.
    - (2) That all applications for removal shall be approved of by the Chief Inspector of Cattle and the Native Commissioner of the District.
    - (3) That the consent of owners, occupiers or managers of occupied lands, or Native Commissioners is obtained in terms of Section 2, Clause (b).
    - (4) That all such cattle are dipped every fourteen days, where a tank is available, or, in the absence of a tank, are thoroughly disinfected by spraying.
7. The movement of "salted" or immune working cattle shall be permitted on the following terms and conditions :—
- (a) That such cattle have been registered and branded under the supervision of the Cattle Inspector with the brand "T.O." on near shoulder and the registration number on near horn, in terms of Section 7, Clauses (a) and (b) of Government Notice No. 109 of 1905.



- (b) That the movement of such cattle shall only take place under the written permit of a duly authorised officer and subject to the condition that they are disinfected by dipping every fourteen days, where a dipping tank is available, or in the absence of a dipping tank, by thorough spraying with an approved insecticide.
- (c) That movement of such cattle shall only be permitted :—
- (1) From the area comprised within the boundaries of the farms Mount Pleasant, Rhino Valley, Cheshire, Doorn Hoek, Vlaknek, Turner's and Sterkstroom in the Inyanga District, along the main road, between that area and the Rusapi Railway Station : provided that such cattle are dipped at Inyanga Police Station every fourteen days, and are not outspanned within a limit of four miles of Rusapi Station.
  - (2) Along the main roads between the Old Umtali Township, the Penhalonga Mine and Umtali.
  - (3) Along the main road from Umtali to Melssetter and Mount Silinda and all confluent roads on the infected area.
8. In the event of failure of pasturage or water on land on which cattle are located, the movement of such cattle will be permitted, provided :
- (a) That such movement shall be to the nearest available pasturage by the most suitable route.
  - (b) That written consent be obtained in terms of Section 2, Clause (b) hereof.
  - (c) That such movement shall be by permit only of a duly authorised officer, and under the supervision of a responsible white man, or of a native approved of by the Cattle Inspector and Native Commissioner of the District.
9. All applications for the removal of cattle under Sections 2, 3 and 8 hereof shall be submitted to and approved of by the local Veterinary Officer before being granted.
10. All permits granted under the provisions of this Notice shall specify the number and brands of cattle, route to be travelled and time allowed for each journey, and all conditions endorsed on such permits by the officer issuing the same shall be strictly observed.
11. All veld-fed animals within the limits of the various Commonages or Town Lands or other centre where there is common grazing ground and wherein cases of African Coast Fever have occurred within two years hereof, and upon which public dipping tanks have been established, shall be dipped therein at least once every fourteen days : provided that the Controller of Stock may, on the advice of the Veterinary Department, direct the temporary suspension of this regulation for such reasons as he may regard as sufficient.
12. The following charges shall be paid at the time of dipping by the owner of the cattle or other animals required to be dipped under these regulations in respect of any dipping done at a public dipping tank :—
- |   |               |
|---|---------------|
| For Horned Cattle (6 months and over) . . . . .       | 3d. per head. |
| For Horses and Mules . . . . .                        | 3d. „         |
| For Calves (6 months and under) and Donkeys . . . . . | 2d. „         |
| For Small Stock . . . . .                             | ½d. „         |
- with a minimum charge of 6d. for any number of animals not aggregating such fee under above tariff.
13. Any disinfecting by spraying required to be done under these regulations shall be carried out with an approved insecticide by the owner of the animals so sprayed : provided that the Inspector may, at his discretion, carry out such disinfection with the assistance of and at the entire cost of the owner of the animals sprayed, the cost of such disinfecting being payable at the time of spraying.
14. Whenever the owner, occupier or manager of a farm shall adopt means for cleansing his cattle running thereon, either by spraying or dipping or any other method permitted by these or any other regulations, the Cattle Inspector may order such natives or others as have cattle on the same farm to cleanse such cattle, and the Native Commissioner of the district in which such farm is situated may enter into an arrangement with the native owners of cattle to cleanse such cattle at a charge to be mutually agreed upon between the said owner, occupier or manager and the said native owners.
15. Any person contravening the provisions of these regulations shall be liable to the punishments prescribed by the Ordinance, and in cases where no special punishment is prescribed by the said Ordinance to a fine of £20 or to three months' imprisonment with or without hard labour in default of payment of any fine inflicted.

## Departmental Notices.

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### DESTRUCTION OF WILD CARNIVORA.

It is hereby notified for public information that commencing on 15th June, 1906, rewards will be paid for the destruction of wild carnivora, within the limits of Southern Rhodesia, on the following terms and conditions, viz. :

£2 10s. each for Lions.

£1 each for Leopards and Cheetahs.

10s. each for Wild Dogs.

5s. each for Jackals, Tiger Cats and Redcat or Lynx.

2s. 6d. each for Baboons.

1s. each for Grey Monkeys.

Rewards will be paid to Europeans by the Magistrate or Native Commissioner, and to natives by the Native Commissioner of the District.

In proof of destruction, applicants for rewards will be required to produce and surrender the skulls of lions and the tail and skin of head and neck of other animals destroyed. Of young animals, where the tail is less than six inches in length, the complete skin must be produced.

Applicants must be prepared to make a solemn declaration to the effect that the animals for which rewards are claimed have been captured and killed within the boundaries of the district of Southern Rhodesia wherein the claim is made and subsequent to June 15th, 1906.

### FARM APPRENTICES.

The Secretary for Agriculture would be glad to receive the names of farmers who would be willing to receive young Englishmen desirous of obtaining acquaintance with local systems of agriculture before taking up land on their own account, and also the terms on which such would be received, as he is in constant receipt of enquiries for such employment.

### STRYCHNINE.

Stockowners can obtain a limited quantity of strychnine for the destruction of carnivora at a cost of 1s. 6d. per half ounce.

## DONKEYS.

The B.S.A.P. Transport Department offer two pure-bred Zanzibar donkey stallions for service. Stud fee, ten shillings. Further particulars may be obtained from the O.C., Transport, Salisbury.

## GOVERNMENT STALLIONS FOR PUBLIC STUD.

The stallions "Robber Knight," and "Dolfos" having been secured for public stud purposes in the Provinces of Matabeleland and Mashonaland respectively, will be stationed at Bulawayo and Salisbury, where a limited number of mares can be served free of charge.

Applications, giving full particulars of the mares to be served, should be addressed to the Veterinary Officers at Bulawayo and Salisbury, from whom further particulars can be obtained.

The owners of mares brought to stud will have to make all necessary arrangements for attendance, stabling and feeding of their animals, as the Department can take no responsibility whatever.

As the number of mares which can be served is very limited, the Veterinary Officers in charge are instructed to refuse service if any mare submitted is suffering from any hereditary disease or is of an inferior type.

## VAPORITE.

The new preparation, "Vaporite," suitable for the destruction of cut-worms, wire-worms, white ants, and other soil-infesting pests, can be obtained from the Department in quantities of not less than 2 cwt. at 17s. 6d. per cwt. Application to be accompanied by remittance covering cost and transport charges.

## GRAM.

A limited quantity of fresh imported seed is available at 3½d. per lb. on application to the Department, accompanied by remittance for cost and transport.

## PASPALUM DILATATUM.

A quantity of this seed is available at 1s. 4d. per lb., on application to the Department. Remittance to accompany order and to include postage or railage.

Quantity of seed required per acre 8 to 10 lbs.



## PRIZE COMPETITION FOR RHODESIAN GROWN TOBACCO LEAF.

The following prizes are offered by the British South Africa Company to be awarded for the best crops of tobacco leaf grown each season during the two years, 1907 and 1908.

1. For Rhodesian grown leaf from Turkish seed and cured in the usual Turkish manner.

(a) Best crop weighing between one thousand and five thousand pounds: £25.

(b) Best crop weighing five thousand pounds and over: £75.

2. For Rhodesian grown leaf from American seed and flue cured.

(a) Best crop weighing between one thousand and five thousand pounds: £25.

(b) Best crop weighing five thousand pounds and over: £75.

### CONDITIONS OF COMPETITION.

1. All competing crops must be cured, dried, packed in bales and delivered for sale at one of the Company's warehouses in Rhodesia.

2. Picked or selected exhibits representing but a portion of a crop cannot enter for competition.

3. Any or all competing crops may be disqualified by the Judges, if in their opinion they are not properly packed or in keeping condition.

4. Two Judges, both expert tobacco leaf men, will be appointed, one to be nominated by the British South Africa Company, and the other by the Rhodesian Agricultural Union. If necessary, an Umpire may be nominated by the Judges.

5. No competitor shall enter for both prizes in the same class.

6. All competing crops shall be the product of the season in which they are entered for competition.

7. Crops can be lodged at one of the Company's warehouses, which will be advertised later, any time during the season up to the end of December, but notice of intention to enter for competition should be sent to the Agricultural Department at as early a date as possible, and not later than 31st October in each year.

## INSTRUCTIONS FOR TAKING SAMPLES OF SOIL FOR ANALYSIS.

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In taking samples of soil for analysis, it is important that they should be of a truly representative character; and, when sending them in to the Department, it should be stated for what purpose it is intended to use the land, whether for cereals, tobacco, lucerne, fruit-growing, etc. If much difference exists in the area to which the analysis is intended to refer, a separate sample of each of the different soils should be forwarded.

Samples should be taken as follows:—

Dig several holes 3 feet deep, the number varying according to the size of the land, care being taken to avoid tree roots, and hills, or any spots marked by rank vegetation or the absence of vegetation. Select the hole showing the most representative character, and from the side of it cut a section with a knife or trowel, about 2 inches square and 10 inches deep, first clearing off the top vegetation. Place this section in a bag by itself (No. 1), then take another section below the first, about 14 inches deep, and put in a separate bag (No. 2); below the second section take a third, about 12 inches deep, and place in a third bag (No. 3). If rock is encountered before this section can be cut, send a sample of the rock, about 1 lb. weight.

When the sample is of cultivated land, the top section should be taken from each of the holes made and thoroughly mixed, and about 4 lbs. of the mixture sent for analysis; 2 or 3 lbs. each of the other sections, taken at the depths mentioned above, from one hole only, is sufficient. When forwarding the samples, as much information as possible should accompany them; such as, whether the situation is near a river, if from sloping or level ground, the behaviour of the land under much rain or severe drought, if it yields good crops or poor, if kraal or other manures have been applied recently and in what quantities.

Samples should be addressed to: The Secretary for Agriculture, Agricultural Department, Salisbury, and accompanied in all cases with full particulars as set forth above. No attention will be paid to samples sent without full details.

Schedule of Charges made for Analysis in the Agricultural Laboratory, Salisbury.

|  | £ | s. | d. |
|--|---|----|----|
| 1. Estimation of two or three constituents in mineral or other manures .....                       | 0 | 15 | 0  |
| 2. Analysis of water for stock or irrigation purposes .....  | 1 | 0  | 0  |
| 3. Estimation of Lime or Phosphoric Acid in rock specimens .....                                   | 0 | 15 | 0  |
| 4. Partial analysis of soil—Mechanical analysis and determination of one or two constituents ..... | 2 | 0  | 0  |
| 5. Complete analysis of soil .....   | 3 | 0  | 0  |

At present no charge will be made to *bona fide* farmers. The charges in the above schedule are for products sent in by merchants, dealers, and others interested in trade. The Analyst will exercise his discretion as to the examination of all samples, whether they are of sufficient importance for determination.

The right of publishing the result of any analysis is reserved by the Department.

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## Editorial Notices.

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Original subscribers to the *Journal*, who have complete sets of the earlier numbers to dispose of, are requested to communicate with this office, as numerous enquiries for the first and second volumes, now out of print, have been received.

Subscriptions to the *Journal* (5s.), issued bi-monthly, should be addressed to the paymaster, Agricultural Department, Salisbury. Only communications relating to the literary department should be addressed to the Editor, and if an answer is required in the pages of the *Journal*, should reach this office not later than the 15th of the month preceding publication. Charges for the insertion of advertisements will be forwarded upon application to the paymaster. Subscribers are requested to notify immediately the non-delivery of the *Journal*.

Farmers requiring latest market prices for produce and live stock at Kimberley, Johannesburg, Bulawayo, Gwelo, Salisbury, Umtali, and Beira, can obtain same from this office by next mail or prepaid wire.

Advertisements will be accepted from *bona fide* farmers wishing to effect sale, purchase or exchange of produce, live stock, or farm implements, at a minimum charge of 2s. 6d. per insertion of 20 words. Extra words will be charged for at the rate of 1s. for every ten words.

Messrs. Hart and Co., Parker's Buildings (P.O. Box 898), Cape Town, Advertising Agents for Cape Colony, Transvaal, Orange River Colony, Natal, and Great Britain. J. Kapnek, P.O. Box 91, Salisbury for Rhodesia.

## ADVERTISEMENTS.

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### Farmers' Advertisement.

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**B**REEDER of Dairy Cattle and Persian Sheep has on hand Young Bull Calves from Cape Cows (Frieslands); Young Rams (pure Persians); Bull Calves, £10 each, taken at 8 months; Rams, £3 each.—C. C. Macarthur, Box 284, Salisbury.

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**B**REEDER of Dairy Cattle has on hand Young Bull Calves from Cape Cows (Frieslands), £10 each, taken at 8 months.—C. C. Macarthur, Box 284, Salisbury.

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**O**FFERS invited for 100 to 200 Head of Slaughter Bullocks, to be delivered at Sipolilos early in 1908.—Apply, stating price per head and average weight expected, to J. C. Innes, Farmer and Local Butcher, Fort Jameson, N.E.R.

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A limited quantity of Breeding Stock and Young Oxen for sale.—Terms can be arranged.

One Howard Baling Press and one Steel double or single Horse Gear, with intermediate gear and pulleys complete.—All above are nearly new.

Particulars can be obtained from The Rhodesian Ranching Co., Ltd., Darwendale, near Salisbury.

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#### FOR SALE.

Seed Potatoes. Proved to withstand the potato moth.—C. M. White, Bulawayo.

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#### FOR SALE.

Pure-bred Berkshire Boars. Pedigree given.—C. M. White, Bulawayo.

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# MEIKLE BROS.,

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SALISBURY,

 Direct Importers.

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Agricultural Implements,

Dairy Appliances.

Provisions.

Hardware.

Cattle Dips.

Spray Pumps.

— Etc., Etc. —

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## PLOWS.

Moline Disc. 1, 2, 3, 4, Fur.  
Flying Dutchman, 2  
Oliver Single Fur. Mouldboards.  
Wiard, Hillside, etc.

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## PLANTERS.

2 Row "Champion."  
3 Row Deere and Mansur Coy.  
Aspinwall's Potato Planter and Sorter.

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## CULTIVATORS.

Martin's 7 and 9 time.  
Planet Jr. Horse, Hoe and Cultivator,  
1 and 2 Row.  
Hallock Weeders. "Dandy" (Riding).

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## HARROWS.

Howard 3-Sec. Drag.  
Disc. Harrows, etc.

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## REAPERS.

McCormick Mowers.  
Hay Rakes. Hay Presses.

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## VEHICLES.

Ox Wagons. Amer Buck Boards.  
Utility Carts.

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GOODS MAY BE IMPORTED FROM ANY FOREIGN  
HOUSE ON SMALL COMMISSION.

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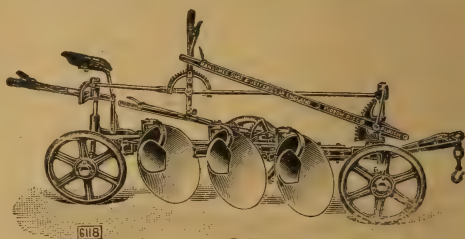
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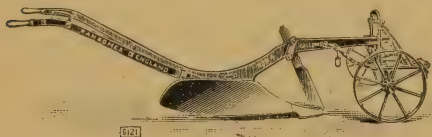


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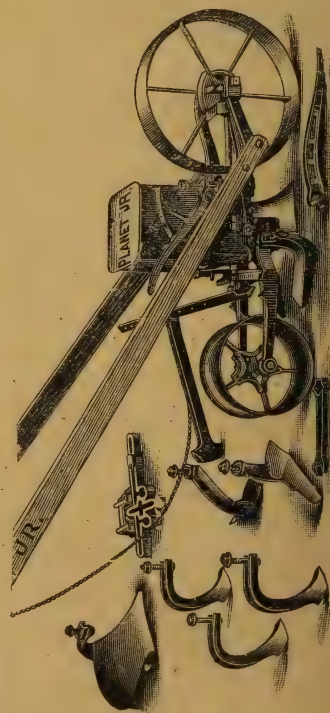
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